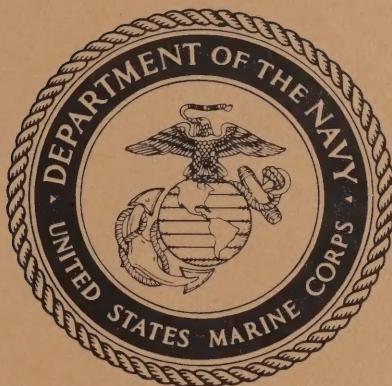


TM-6625-45/2-2
VOLUME 2

U.S. MARINE CORPS TECHNICAL MANUAL

COMMUNICATIONS TEST KIT, MK-1102/TYA-11,
COMMUNICATIONS TEST KIT, MK-1104/TYA-11
AND
TEST SET COUPLER, MX-8154/TYA-11

OPERATING INSTRUCTIONS



18 OCTOBER 1968

TM-6625-45/2-2
VOLUME 2

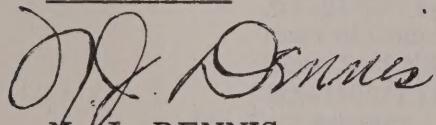
DEPARTMENT OF THE NAVY
Headquarters, U.S. Marine Corps
Washington, D. C. 20380

18 October 1968

1. This Manual is effective upon receipt and provides operation instructions for the Communications Central Group, AN/TYA-11.
2. Notice of discrepancies and suggested changes to this Manual should be forwarded to the Commandant of the Marine Corps (Code CSY).

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

OFFICIAL



N. J. DENNIS
Colonel, U.S. Marine Corps
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SECTION 3

OPERATION

3-1. FUNCTIONAL OPERATION

a. TEST SET COUPLER, MX-8154/TYA-11. The function of Test Set Coupler, MX-8154/TYA-11, is to provide a convenient method of testing the assemblies of Communications Central Group, AN/TYA-11, listed below, when the assemblies are removed from the overall system.

1. Radio Set Control Assembly, ECI 01-00507-001

2. Indicator Test Electrical Assembly, ECI 01-00508-001

3. DC Power Supply, ECI 01-00509-001

4. Five Channel Audio Amplifier-Converter, ECI 01-00730-001

5. Communications Central Group Control, C-8019/TYA-11.

Note

ITEMS 1, 2, AND 3 ARE PART OF CONTROL-POWER SUPPLY GROUP, ECI 01-00513-001.

Simulated input signals for the assembly under test are provided by ancillary test equipment and by signal generation circuitry within the test set. The test set also provides required dc operating voltages for the assembly being tested and controls the selection of function to be tested. Test results are determined from the indications observed on the assembly under test, the test set, and ancillary test equipment. Interconnections between Test Set Coupler, MX-8154/TYA-11, the assembly under test, and a primary power source are accomplished with Special Purpose Electrical Cable Assemblies W1 through W8 which are stored in the test set cover.

b. COMMUNICATIONS TEST KIT, MK-1104/TYA-11. Communications Test Kit, MK-1104/TYA-11, is composed of 23 test accessories

contained in a portable transit case. The accessories of the MK-1104/TYA-11 are used for testing and troubleshooting various assemblies and subassemblies of Communications Central Group, AN/TYA-11. Individual accessories, and the intended uses, are identified and described in paragraph 1-2b of this manual. Since the accessories contained in the MK-1104/TYA-11 consist of printed circuit board extenders, extender cables, and cable adapters, individual operating instructions are not applicable. Operational use of the accessories is described in the appropriate troubleshooting procedures contained in the prime equipment manuals.

c. COMMUNICATIONS TEST KIT, MK-1102/TYA-11. Communications Test Kit, MK-1102/TYA-11, is composed of 37 maintenance accessories used for testing and troubleshooting various assemblies and subassemblies of Communications Central Group, AN/TYA-11. The major maintenance accessories contained in the MK-1102/TYA-11 are as follows:

1. Test Adapter, MX-8150/TYA-11
2. Test Adapter, MX-8151/TYA-11
3. Test Adapter, MX-8152/TYA-11
4. Test Set Coupler, MX-8153/TYA-11
5. Radio Set Control, C-3811/AR

6. Fixed Mounting Rotating Counter, ECI 03-01937-001.

The above listed test fixtures, when used in conjunction with the test cables and other accessories contained in Communications Test Kit, MK-1102/TYA-11, provide the means of testing and troubleshooting specific assemblies and subassemblies of the AN/TYA-11 when the assemblies are physically and electrically removed from the overall system. Functional operation of each of the six major test fixtures is described in subsequent paragraphs. Functional operation of the test cables, cable adapters,

etc. is not applicable; therefore, in the remainder of this chapter those accessories are described only in their association to the major test fixtures.

(1) Test Adapter, MX-8150/TYA-11. Test Adapter, MX-8150/TYA-11, is a 71-jack, break-out box which provides a convenient means of applying simulated input signals to a Radio Set, AN/GRC-112, removed from Communications Central Group, AN/TYA-11, for testing or troubleshooting. The Test Adapter also provides test points for monitoring Radio Set, AN/GRC-112, outputs normally applied to other assemblies of the AN/TYA-11. Interconnection between Test Adapter, MX-8150/TYA-11, and the Radio Set, AN/GRC-112, being tested is accomplished through two cables permanently attached to the Test Adapter and Special Purpose Electrical Cable Assembly W4, CX-10917/TYA-11. Interconnection between the AN/GRC-112 under test and primary power (120/208 vac, 3 phase, 400 cps) is accomplished with Electrical Power Cable Assembly W1, CX-10932/TYA-11. Cables CX-10917/TYA-11 and CX-10932/TYA-11 are part of Communications Test Kit, MK-1102/TYA-11.

(2) Test Adapter, MX-8151/TYA-11. Test Adapter, MX-8151/TYA-11, is a 17-jack break-out box used to distribute simulated input signals, produced by ancillary test equipment, to a Radio Set, AN/GRC-134, removed from Communication Central Group, AN/TYA-11, for test or troubleshooting. Radio Set, AN/GRC-134, output signals are routed to test jacks on the Test Adapter for monitoring on ancillary test equipment. There are no operating controls or indicators on Test Adapter, MX-8151/TYA-11. Interconnection between the Test Adapter and Radio Set, AN/GRC-134, is accomplished by means of a single cable, permanently attached to the Test Adapter, which mates with connector A4A1J1 on the AN/GRC-112. Electrical Power Cable Assembly W2, CX-10933/TYA-11, part of Communications Test Kit, MK-1102/TYA-11, is used to provide primary power to Radio Set, AN/GRC-134.

(3) Test Adapter, MX-8152/TYA-11. The function of Test Adapter, MX-8152/TYA-11, is to provide a means of testing and troubleshooting Tuned Cavity, FR-173/GRC, and Antenna Coupler, CU-1406/GRC, when the Antenna Coupler is physically and electrically removed from Communications Central Group, AN/TYA-11, or the FR-173/GRC is removed from the CU-1406/GRC. The Test Adapter, operates in conjunction with Radio Set Control, C-3811/AR, to provide power (115 vac, phase A and B, 400 cycle and

+28 vdc) and test control signals to the Tuned Cavity, FR-173/GRC, selected for test. Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11, part of Communications Test Kit, MK-1102/TYA-11, provides interconnection between the Test Adapter, MX-8152/TYA-11, and Radio Set Control, C-3811/AR. Three cable connectors (P1, P2, and P3), permanently attached to the Test Adapter provide interconnection between the Test Adapter, primary power source, and the Antenna Coupler, CU-1406/GRC, under test. Special Purpose Electrical Cable Assembly W8, CX-11733/TYA-11, provides the interconnection between the Test Adapter and the individual Tuned Cavity, FR-173/GRC. Cable connector P3 mates with the primary power source which, under control of AC ON/OFF switch on the Test Adapter is distributed to Antenna Coupler, CU-1406/GRC, Radio Set Control, C-3811/AR, and control circuitry within the Test Adapter. Cable connector P1 mates with the input connector (J1, J2, J3, or J4) on Antenna Coupler, CY-1406/GRC, associated with Tuned Cavity, FR-173/GRC, being tested.

Note

ANTENNA COUPLER CONNECTORS J1 THROUGH J4 ARE ASSOCIATED WITH TUNED CAVITIES 1 THROUGH 4, RESPECTIVELY.

Connector P2 routes power (115 vac and +28 vdc) and test control signals provided by Radio Set Control, C-3811/AR, to the selected Tuned Cavity, FR-173/GRC, Test Adapter connector P2, which mates with connector J5 on Antenna Coupler, CU-1406/GRC, routes outputs of the four cavities in the CU-1406/GRC to front panel test jacks on the Test Adapter. In addition to control of ac power distribution Test Adapter, MX-8152/TYA-11, contains a regulated +28 vdc power supply which provides control voltages for Antenna Coupler, CU-1406/GRC, and Radio Set Control, C-3811/AR. Distribution of the +28 vdc power is controlled by DC ON/OFF switch on the front panel of the Test Adapter.

(4) Test Set Coupler, MX-8153/TYA-11. The function of Test Set Coupler, MX-8153/TYA-11, is to provide a means of test and troubleshooting Synthesizer- Receivers, O-1282(V)/GRC, (ECI 01-00510-001), (ECI 01-00510-002), or (ECI 01-00510-003), assemblies of Radio Set, AN/GRC-112, or AN/GRC-134, when the Synthesizer-Receiver is removed from the associated radio. Test Set Coupler, MX-8153/TYA-11, operates in conjunction with Radio Set Control, C-3811/AR, to provide ac power (115 vac, phase

A and B, 400 cps), dc power (+28 vdc and -18 vdc), and test control signals to a Synthesizer-Receiver under test. Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11, part of Communications Test Kit, MK-1102/TYA-11, provides interconnection between the Test Set Coupler, MX-8153/TYA-11, and Radio Set Control, C-3811/AR. Three permanently attached cable connectors (P1, J1, and J2) provide the interconnections between Test Set Coupler, MX-8153/TYA-11, the primary power source and the Synthesizer-Receiver under test. Test fixture connector P1 mates with the primary power source which, under control of the AC ON/OFF switch on the Test Set Coupler, is distributed to Radio Set Control, C-3811/AR, the Synthesizer-Receiver under test, and control circuitry within the test fixture. Test fixture connectors J1 and J2 mate with connectors P1 and P2, respectively, on the Synthesizer-Receiver and provide for routing power (115 vac, phase B, +28 vdc, and -18 vdc) and test signals to and from the unit under test. Test Set Coupler, MX-8153/TYA-11, contains 35 front panel test jacks; 24 for monitoring test inputs to the Synthesizer-Receiver under test, 10 for monitoring test results, and a dc return. The test fixture also contains two BNC connectors, ANT A1 and VFO A2, which provide connection points for ancillary test equipment to simulate an antenna input and monitor intermediate frequency output, respectively. In addition to AC ON/OFF and DC ON/OFF power control switches, three front panel switches RCVR MUTE ON/OFF, TENTHS ON/OFF, and SQUELCH DIS ON/OFF provide test control of specific functions. Two indicators, COMMAND GATE and SERVO TUNE, indicate status of specific Synthesizer-Receiver operations.

(5) Radio Set Control, C-3811/AR. Radio Set Control, C-3811/AR, operates in conjunction with Test Adapter, MX-8152/TYA-11, and Test Set Coupler, MX-8153/TYA-11, to provide frequency selection control when testing an Antenna Coupler, CU-1406/GRC, or a Synthesizer-Receiver, O-1282(V)/GRC, respectively. Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11, provides the interconnection between Radio Set Control, C-3811/AR, and the applicable test fixture. Test frequency selection is operator controlled from the front panel of the C-3811/AR by means of the MANUAL SELECT thumbwheel switches.

(6) Fixed-Mounting Rotating Counter, ECI 03-01937-001. Fixed-Mounting Rotating Counter, ECI 03-01937-001, is a mechanically driven, three digit counter (000 to 999) used to check the alignment accuracy of the tuned cavity in Amplifier Assembly, AM-4343(V)/GRC, (IPA), of Radio Set, AN/GRC-112, or AN/GRC-134.

3-2. PREPARATION FOR USE. Test Set Coupler, MX-8154/TYA-11, and Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, require no preparation for use other than interconnection within the specific test setup as described in the operating procedures.

3-3. OPERATING INSTRUCTIONS

a. OPERATING CONTROLS AND INDICATORS. The following paragraphs identify locations and describe the purpose of all operating controls, indicators, connectors, and test points on Test Set Coupler, MX-8154/TYA-11 and applicable assemblies of Communications Test Kits, MK-1102/TYA-11, and MK-1104/TYA-11.

(1) Test Set Coupler, MX-8154/TYA-11. The controls, indicators, connectors, and test points used in operation of Test Set Coupler, MX-8154/TYA-11 are identified on Figure 3-1. Table 3-1 describes the type and function of each item identified on Figure 3-1.

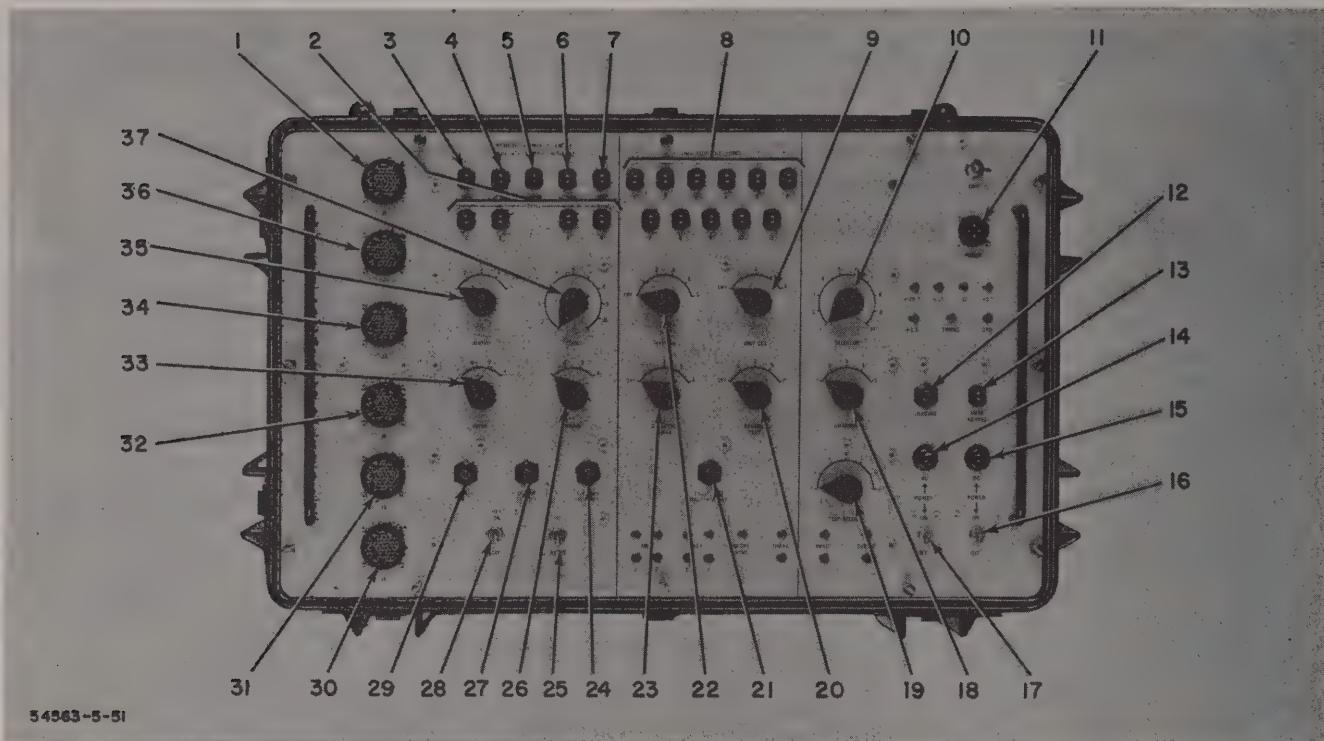
(2) Test Adapter, MX-8150/TYA-11, (part of Communications Test Kit, MK-1102/TYA-11). Figure 3-2 shows the location of all test points and connectors used in operation of Test Adapter, MX-8150/TYA-11. The purpose of each test point and connector is described in Table 3-2.

(3) Test Adapter, MX-8151/TYA-11, (part of Communications Test Kit, MK-1102/TYA-11). Figure 3-3 shows the location of all test points and connectors used in the operation of Test Adapter, MX-8151/TYA-11. The purpose of each test point and connector is described in Table 3-3.

(4) Test Adapter, MX-8152/TYA-11, (part of Communications Test Kit, MK-1102/TYA-11). Figure 3-4 shows the location of all controls, indicators, connectors and test points used in the operation of Test Adapter, MX-8152/TYA-11. The purpose of each control, indicator, connector, and test point is identified in Table 3-4.

(5) Test Set Coupler, MX-8153/TYA-11, (part of Communications Test Kit, MK-1102/TYA-11). Figure 3-5 shows the location of all controls, indicators, connectors and test points used in the operation of Test Set Coupler, MX-8153/TYA-11. The function of each control, indicator, connector, and test point is described in Table 3-5.

(6) Test Adapter, MX-8158/TYA-11, (part of Communications Test Kit, MK-1104/TYA-11). Figure 3-6 shows the location of all test points and connectors used in operation of Test Adapter, MX-8158/TYA-11. The function of each test point and connector is described in Table 3-6.



1. J1 (CONNECTOR)
2. CODE 1-4 (INDICATOR)
3. MIKE (INDICATOR)
4. IN USE (INDICATOR)
5. POWER (INDICATOR)
6. KEYING (INDICATOR)
7. XMIT (INDICATOR)
8. INDICATOR TEST PANEL 1-11 (INDICATORS)
9. XMIT SET (SWITCH)
10. SELECTOR (SWITCH)
11. POWER (CONNECTOR)
12. LOADING (SWITCH)
13. XMTR KEYING (INDICATOR)
14. AC POWER ON/OFF (INDICATOR)
15. DC POWER ON/OFF (INDICATOR)
16. DC POWER ON/OFF (CIRCUIT BREAKER)
17. AC POWER ON/OFF (CIRCUIT BREAKER)
18. CHANNEL (SWITCH)
19. TEST SELECT (SWITCH)
20. RECEIVE TEST (SWITCH)
21. LIGHT TEST MASTER RESET (SWITCH)
22. TEST KEY (SWITCH)
23. SELECTOR CHECK (SWITCH)
24. CHANNEL ACTIVATE (SWITCH)
25. IC RADIO (SWITCH)
26. RADIO (SWITCH)
27. OUT OF SERVICE (SWITCH)
28. PTT ON/OFF (SWITCH)
29. KEY 1 (SWITCH)
30. J6 (CONNECTOR)
31. J5 (CONNECTOR)
32. J4 (CONNECTOR)
33. INPUT (SWITCH)
34. J3 (CONNECTOR)
35. AUDIO (SWITCH)
36. J2 (CONNECTOR)
37. J1 (CONNECTOR)

Figure 3-1. Test Set Coupler, MX-8154/TYA-11 Front Panel Operating Controls, Indicators, Connectors, and Test Points

TABLE 3-1. TEST SET COUPLER, MX-8154/TYA-11,
OPERATING CONTROLS, INDICATORS, CONNECTORS, AND TEST POINTS

ITEM	TYPE	FUNCTION
MIKE indicator DS1	Lamp	Lights to indicate handset mode of operation selected on unit under test
IN USE indicator DS2	Lamp	Lights to indicate control circuitry for radio selected by RADIO switch is activated when testing Communications Central Control Group, C-8019/TYA-11
POWER indicator DS3	Lamp	Lights to indicate power applied to Radio Set Control Assembly, ECI 01-00507-001 when under test
KEYING indicator DS4	Lamp	Lights to indicate control circuits of Radio Set Control Assembly or Communications Central Control Group being tested are in automatic keying mode of operation
XMIT indicator DS5	Lamp	Lights to indicate control circuitry in Radio Set Control Assembly associated with radio selected by AUDIO switch S1 is in transmit mode
CODE 1 thru 4 indicators DS6 thru DS9	Lamps	Display the four digit channel code selected by CODE switch S2
SELECTOR CHECK switch S13	Switch, rotary, 5 position, 6 wafer	Provides ground level signals to test circuitry associated with selected radio (1 thru 4) for checking keying, transmit command, and receives test functions
CHANNEL switch S16	Switch, rotary, 5 position	Provides operator control of selection of 1 of 5 audio amplifier stages for test when checking Five Channel Audio Amplifier-Converter, ECI 01-00730-001
TEST KEY switch S10	Switch, rotary, 6 position, 2 wafer	Selects 1 of 5 push-to-key control circuits on Indicator Test Electrical Assembly, ECI 01-00508-001, for test
INDICATOR TEST PANEL 1 thru 11 indicators	Lamps	Provide status indications of various functions test on Indicator Test Electrical Assembly, ECI 01-00508-001

TABLE 3-1. (Continued)

ITEM	TYPE	FUNCTION
XMIT SET switch S11	Switch, rotary, 5 position, 5 wafer	Selects 1 of 4 transmit control circuits on Indicator Test Electrical Assembly, ECI 01-00508-001, for test
POWER connector J7	Connector	Connection point for applying primary ac power to test set
LOADING switch S18	Switch, pushbutton	When pressed causes 12 relays in Five Channel Audio Amplifier-Converter, ECI 01-00730-001, to energize in order to test loading effect on +28 vdc power supply in the Five Channel Audio Amplifier-Converter
XMTR KEYING indicator DS21	Lamp	When lighted indicates amplifier board in Five Channel Audio Amplifier-Converter, ECI 01-00730-001 associated with Radio Set selected by CHANNEL switch is activated
DC POWER indicator DS22	Lamp	When on indicates test set generated dc voltages are being distributed
AC POWER indicator DS23	Lamp	Lights to indicate primary ac power is applied to test set
AC POWER ON/OFF circuit breaker CB1	Circuit breaker	In the ON position applies primary ac power to test set
DC POWER ON/OFF circuit breaker CB2	Circuit breaker	In the ON position activates dc power distribution circuits
SELECTOR switch S15	Switch, rotary, 10 position, 10 wafer	Controls distribution of test signals and voltages to and from Indicator Test Electrical Assembly, ECI 01-00508-001, DC Power Supply, ECI 01-00509-001, or Five Channel Audio Amplifier-Converter, ECI 01-00730-001
TEST SELECT switch S17	Switch, rotary, 7 position, 7 wafer	1. Controls routing of Indicator Test Electrical Assembly, ECI 01-00508-001, DC Power Supply, ECI 01-00509-001, and Radio Set Control Assembly, ECI 01-00507-001 outputs to OUTPUT test points on test set

TABLE 3-1. (Continued)

ITEM	TYPE	FUNCTION
TEST SELECT switch S17 (Cont)		2. Controls routing of external input signals at INPUT test points to Radio Set Control Assembly and Communications Central Control Group, C-8019/TYA-11
RECEIVE TEST switch S12	Switch, rotary, 5 position, 2 wafer	Controls special function test on Indicator Test Electrical Assembly, ECI 01-00508-001
LIGHT TEST MASTER RESET switch S14	Switch, pushbutton	When pressed resets flip-flop circuits of Indicator Test Electrical Assembly, ECI 01-00508-001 under test and lights 18 indicators on the Indicator Test Electrical Assembly front panel
CHANNEL ACTIVATE switch 9	Switch, pushbutton	When pressed routes outputs of test set pulse generator to control circuitry, in Radio Set Control Assembly, associated with radio selected by RADIO switch S4
OUT OF SERVICE switch S8	Switch, pushbutton, 4 pole, double throw	When pressed activates out-of-service monitoring circuits in Radio Set Control Assembly under test
IC/RADIO switch S6	Switch, toggle, dpdt	Selects intercom or radio mode of operation
Radio switch S4	Switch, rotary, 4 position, 12 wafer	Provides operator control of distribution of test signals and voltages to and from 1 of 4 radio set control circuits when testing Radio Set Control Assembly, ECI 01-00507-001 or Communications Central Control Group, C-8019/TYA-11
PTT ON/OFF switch S5	Switch, toggle, dpdt	In the ON position activates push-to-talk (handset) circuitry on Radio Set Control Assembly or Communications Central Control Group under test
J6 connector	Connector	Interconnects test set with Five Channel Audio Amplifier-Converter, ECI 01-00730-001 through Branched Special Purpose Electrical Cable Assembly W7, ECI 12-01292-001
KEY 1 switch S7	Switch, pushbutton	Applies keying ground to Radio Set Control Assembly under test

TABLE 3-1. (Continued)

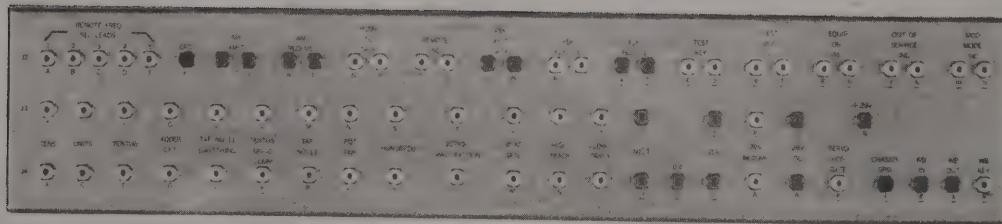
ITEM	TYPE	FUNCTION
J5 connector	Connector	Interconnects test set with Communications Central Control Group, C-8019/TYA-11 through Branched Special Purpose Electrical Cable Assembly W6, ECI 12-01291-001
INPUT switch S3	Switch, rotary, 4 position, 2 wafer	With TEST SELECT switch in position 2, controls distribution of externally generated test signals from INPUT test points to Radio Set Control Assembly and distribution of resultant test outputs to OUTPUT test jacks
J4 connector	Connector	Interconnects test set with Indicator Test Electrical Assembly, ECI 01-00508-001, or DC Power Supply, ECI 01-00509-001, through Branched Special Purpose Electrical Cable Assemblies W4, ECI 12-01289-001, and W5, ECI 12-01290-001, respectively
CODE switch S2	Switch, rotary, 11 position, 4 wafer	Provides ten 4-digit codes to Radio Set Control Assembly for preset channel selection testing
J3 connector	Connector	Interconnects test set with Radio Set Control Assembly, ECI 01-00507-001, through Branched Special Purpose Electrical Cable Assembly W3, ECI 12-01288-001
AUDIO switch S1	Switch, rotary, 5 position, 12 wafer	Provides operator control of test signal and voltage distribution to and from Radio Set Control Assembly and Communications Central Control Group
J2 connector	Connector	Interconnects test set with Indicator Test Electrical Assembly, ECI 01-00508-001, through Branched Special Purpose Electrical Cable Assembly W2, ECI 12-01287-001
J1 connector	Connector	Interconnects test set with Radio Set Control Assembly, ECI 01-00507-001 through Branched Special Purpose Electrical Cable Assembly W1, ECI 12-01286-001

TABLE 3-1. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed):		
+26.5 test point J24	Tip jack, red	Monitoring point for +26.5 vdc power supply output
+12 test point J25	Tip jack, red	Monitoring point for output of test set +12 volt regulator
-12 test point J26	Tip jack, red	Monitoring point for output of test set -12 vdc power supply
+5.1 test point J27	Tip jack, red	Monitoring point for output of test set +5.1 vdc power supply
+1.6 test point J28	Tip jack, red	Monitoring point for test set +1.6 vdc output
TIMING test point J30	Tip jack, green	Test point for monitoring output of test set pulse generator and sync circuitry
INPUT test points J31 and J32	Tip jacks, green and black, respectively	Connection points for external signal generation equipment
OUTPUT test points J33 and J34	Tip jacks, green and black, respectively	Test points for connection of external monitoring equipment
TIMING test points J18 and J23	Tip jacks, green and black, respectively	Test points for monitoring timing signal output of Indicator Test Electrical Assembly, ECI 01-00508-001
SCOPE SYNC test point J17	Tip jack, green	Test point for synchronization of oscilloscope when monitoring timing signal output of Indicator Test Electrical Assembly, ECI01-00508-001
KEY 2 test points J16 and J22	Tip jacks, green and black, respectively	Test points for monitoring negative going key command output pulse of Indicator Test Electrical Assembly, ECI 01-00508-001
KEY 1 test points J15 and J21	Tip jacks, green and black, respectively	Test points for monitoring positive going key command output pulse of Indicator Test Electrical Assembly, ECI 01-00508-001
XMIT 2 test points J14 and J20	Tip jacks, green and black, respectively	Test points for monitoring negative going pulse test message output of Indicator Test Electrical Assembly, ECI 01-00508-001

TABLE 3-1. (Continued)

ITEM	TYPE	FUNCTION
XMIT 1 test points J13 and J19	Tip jacks, green and black, respectively	Test points for monitoring positive going pulse test message output of Indicator Test Electrical Assembly, ECI 01-00508-001
GRD test point J29	Tip jack, black	Ground terminal used during testing
GRD lug	Stud, with nut	Used to ground test set coupler to an external ground



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Figure 3-2. Test Adapter MX-8150/TYA-11 Test Points and Connectors

TABLE 3-2. TEST ADAPTER, MX-8150/TYA-11, TEST POINTS AND CONNECTORS

ITEM	TYPE	FUNCTION
Plug P2 (located on top of Test Adapter)	Cable assembly	Mates with Radio Set, AN/GRC-112, connector A7A1J2 for distribution of test input and output signals and voltages
Plug P3 (located on top of Test Adapter)	Cable assembly	Mates with Radio Set, AN/GRC-112, connector A7A1J3 for distribution of test input and output signals and voltages
Plug P4 (located on top of Test Adapter)	Connector	Interconnects Test Adapter with Radio Set, AN/GRC-112, through Special Purpose Electrical Cable Assembly W4, CX-10917/TYA-11
Test points (not indexed): J2-A, -B, -C, -D, -E/ REMOTE FREQ SEL LEADS 1, 2, 3, 4, 5 test jacks J1 thru J5	Tip jacks, white	Connection points for routing test remote frequency selection inputs to Radio Set, AN/GRC-112
J2-F/GRD test jack J6	Tip jack, black	Ground test point
J2-G and -H/AM XMIT test jacks J7 and J8	Tip jacks, green	Connections points for simulated narrow band audio input
J2-K and -L/AM RE- CEIVE test jacks J9 and J10	Tip jacks, green	Test points for monitoring narrow band audio output
J2-N and -P/PUSH TO TALK test jacks J11 and J12	Tip jacks, white	When connected together provide test push-to-talk keying input to Radio Set, AN/GRC-112
J2-T and -U/REMOTE IND test jacks J13 and J14	Tip jacks, white	Test points for monitoring status of remote indicator output circuit
J2-V and -W/FSK XMIT DATA test jacks J15 and J16	Tip jacks, green	Connection points for simulated fsk data inputs
J2-X and -Z/FSK KEY- LINE test jacks J17 and J18	Tip jacks, white	Connection points for simulated fsk keying inputs
J2-a and -b/FSK RE- CEIVE test jacks J19 and J20	Tip jacks, green	Test points for monitoring fsk data outputs

TABLE 3-2. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
J2-c and -d/TEST KEY test jacks J21 and J22	Tip jacks, white	When connected together simulate remote test key input
J2-e and -f/TEST MOD IND test jacks J23 and J24	Tip jacks, white	Test points for monitoring operating mode output indication (continuity in test mode, open in normal or VOX modes)
J2-g and -h/EQUIP ON IND test jacks J25 and J26	Tip jacks, white	Test points for monitoring power sta- tus output indication (continuity when power applied to radio set, open when power removed)
J2-j and -k/OUT OF SERVICE IND test jacks J27 and J28	Tip jacks, white	Test points for monitoring output voice mode status indication (contin- uity indicates normal operation, open indicates malfunction of voice mode operation)
J2-m and -n/MOD MODE IND test jacks J29 and J30	Tip jacks, white	Test points for monitoring operating mode output indication (continuity indicates data mode, open indicates voice mode)
J3-A/TENS test jack J31	Tip jack, white	Test point for monitoring receiver section tens digit frequency selection voltage
J3-C/UNITS test jack J32	Tip jack, white	Test point for monitoring receiver section units digit frequency selection voltage
J3-E/TENTHS test jack J33	Tip jack, white	Test point for monitoring receiver section tenths digit frequency selec- tion voltage
J3-G/ADDER CKT test jack J34	Tip jack, white	Test point for monitoring receiver section adder circuit reference voltage
J3-J/TAP NO. 11 SWITCHING test jack J35	Tip jack, white	Test point for monitoring tap 11 ser- vo-command voltage output of re- ceiver section frequency selection control transformer T5

TABLE 3-2. (Continued)

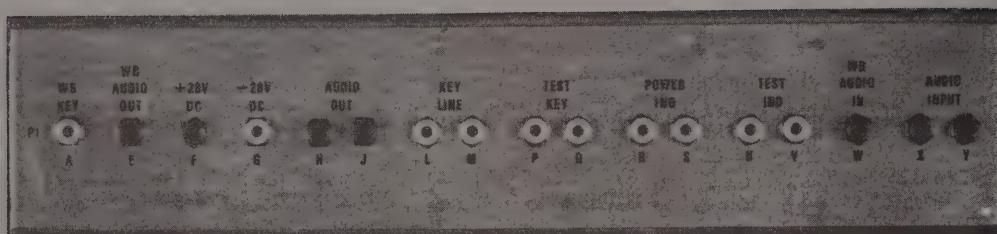
ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
J3-L/SERVO TENTHS COMM test jack J36	Tip jack, white	Test point for monitoring receiver section servocommand gate for frequency selection tenths digit
J3-M/TAP NO. 13 test jack J37	Tip jack, white	Test point for monitoring voltage applied to tap 13 of receiver section frequency selection control transformer T5
J3-N/POT TAP test jack J38	Tip jack, white	Test point for monitoring receiver section frequency selection voltage applied to followup potentiometer (TP J3-G voltage when hundreds digit a3, TP J3-J voltage when hundreds digit a2)
J3-S/HUNDREDS test jack J39	Tip jack, white	Test point for monitoring receiver section frequency selection hundreds digit output voltage (ground represents 200, open represents 300)
J3-T/SERVO MAL- FUNCTION test jack J40	Tip jack, white	Test point for monitoring receiver section servo malfunction output signal (+28 vdc when servo is tuning)
J3-U/50 KC GATE test jack J41	Tip jack, white	Test point for monitoring receiver section hundredths digit frequency selection voltage (ground represents a 5, +28 vdc represents a 0)
J3-V/HIGH TRACK test jack J42	Tip jack, white	Test point for monitoring voltage applied to high track input of receiver section followup potentiometer
J3-X/LOW TRACK test jack J43	Tip jack, white	Test point for monitoring voltage applied to low track input of receiver section
J3-Z/NEUT test jack J44	Tip jack, gray	Ac neutral test point
J3-a/ØB test jack J45	Tip jack, gray	Test point for monitoring 120v, 400 cps ØB input to Radio Set, AN/GRC-112
J3-b/28V RETURN test jack J46	Tip jack, white	Dc return

TABLE 3-2. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
J3-d/28V DC test jack J47	Tip jack, red	Test point for monitoring +28 vdc output to transmitter antenna coupler
J3-R/+28V test jack J48	Tip jack, red	Test point for monitoring fused +28 vdc output of receiver section voltage regulator
J4-A/TENS test jack J49	Tip jack, white	Test point for monitoring transmitter section tens digit frequency selection voltage
J4-C/UNITS test jack J50	Tip jack, white	Test point for monitoring transmitter section units digit frequency selection voltage
J4-E/TENTHS test jack J51	Tip jack, white	Test point for monitoring transmitter section adder circuit reference voltage
J4-G/ADDER CKT test jack J52	Tip jack, white	Test point for monitoring transmitter section adder circuit reference voltage
J4-J/TAP NO. 11 SWITCHING test jack J53	Tip jack, white	Test point for monitoring tap 11 servo-command voltage output of transmitter section frequency selection control transformer T4
J4-e/TENTHS SERVO COMM test jack J54	Tip jack, white	Test point for monitoring transmitter section servo-command gate for frequency selection tenths gate
J4-p/TAP NO. 13 test jack J55	Tip jack, white	Test point for monitoring voltage applied to tap 13 of transmitter section frequency selection control transformer T4
J4-R/POT TAP test jack J56	Tip jack, white	Test point for monitoring transmitter section frequency selection voltage applied to followup potentiometer (TP J4-G voltage when hundreds digit a3, or TP J4-J voltage when hundreds digit a2)
J4-S/HUNDREDS test jack J57	Tip jack, white	Test point for monitoring transmitter section frequency selection hundreds digit output voltage (ground represents 200, open represents 300)

TABLE 3-2. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
J4-L/SERVO MAL-FUNCTION test jack J58	Tip jack, white	Test point for monitoring transmitter section servo malfunction output signal (+28 vdc level when SERVO is tuning)
J4-M/50 KC GATE test jack J59	Tip jack, white	Test point for monitoring transmitter section hundredths digit frequency selection voltage (ground represents a 5, +28 vdc represents a 0)
J4-N/HIGH TRACK test jack J60	Tip jack, white	Test point for monitoring voltage applied to high track input of transmitter section followup potentiometer
J4-T/LOW TRACK test jack J61	Tip jack, white	Test point for monitoring voltage applied to low track input of transmitter section followup potentiometer
J4-b/NEUT test jack J62	Tip jack, gray	Ac neutral test point
J4-c/ØA test jack J63	Tip jack, gray	Test point for monitoring 120v, 400 cps, ØA output voltage
J4-d/ØB test jack J64	Tip jack, gray	Test point for monitoring 120v, 400 cps, ØB output voltage
J4-X/28V RETURN test jack J65	Tip jack, white	Dc return
J4-W/28V DC test jack J66	Tip jack, red	Test point for monitoring +28 vdc output to receiver antenna coupler
J4-h/SERVO POSGATE test jack J67	Tip jack, white	Test point for monitoring servo position gate output
J4-j/CHASSIS GRD test jack J68	Tip jack, black	Ground test point
J4-g/WB IN test jack J69	Tip jack, green	Connection point for simulated wide band audio input signal
J4-s/WB OUT test jack J70	Tip jack, green	Test point for monitoring wide band audio output signal
J4-r/WB KEY test jack J71	Tip jack, white	When grounded, place Radio Set, AN/GRC-112, in wide band audio mode of operation



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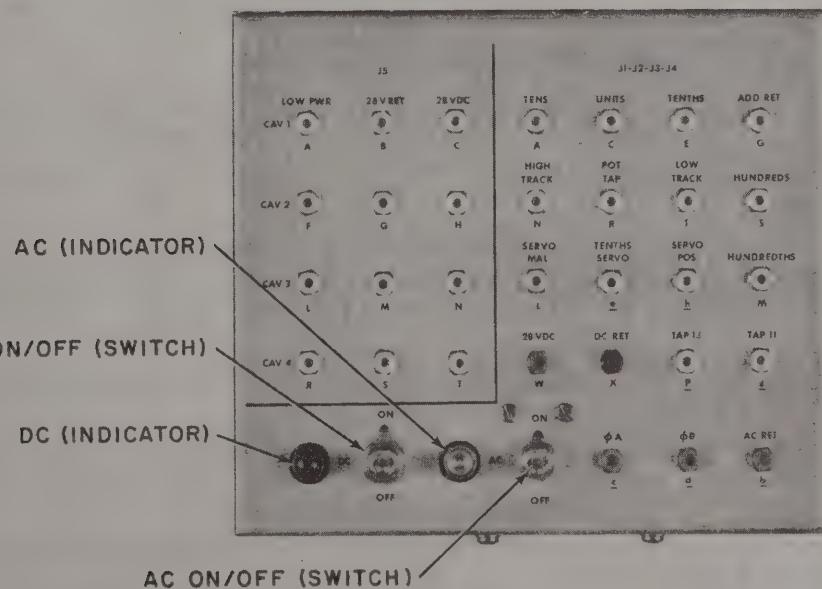
Figure 3-3. Test Adapter, MX-8151/TYA-11, Test Points and Connectors

TABLE 3-3. TEST ADAPTER, MX-8151/TYA-11, TEST POINTS AND CONNECTORS

ITEM	TYPE	FUNCTION
Plug P1 (located on top of Test Adapter)	Connector	Provides interconnection between Test Adapter and Radio Set, AN/GRC-134, under test
Test points (not indexed):		
P1-A/WB KEY test jack J1	Tip jack, white	Connection point for testing wide band keying input (ground)
P1-E/WB AUDIO OUT test jack J2	Tip jack, green	Test point for monitoring wide band audio output signal
P1-F/+28V DC test jack J3	Tip jack, red	Test point for +28 vdc output of Radio Set, AN/GRC-134, under test
P1-G/-28V DC test jack J4	Tip jack, white	Dc return
P1-H and -J/AUDIO OUT test jacks J5 and J6	Tip jacks, green	Test points for monitoring narrow band audio output signal

TABLE 3-3. (Continued)

ITEM	TYPE	FUNCTION
P1-L and -M/KEY LINE test jacks J7 and J8	Tip jacks, white	Connection points for simulated remote keying input signal
P1-P and -Q/TEST KEY test jacks J9 and J10	Tip jacks, white	Connection points for simulated test keying input signal
P1-R and -S/POWER IND test jacks J11 and J12	Tip jacks, white	Test points for monitoring radio set power on/off status remote indication
P1-U and -V/TEST IND test jacks J13 and J14	Tip jacks, white	Test points for monitoring radio set KEY CONTROL switch status
P1-W/WB AUDIO IN test jack J15	Tip jack, green	Connection point for test wide band audio input signal
P1-X and -Y/AUDIO IN- PUT test jacks J16 and J17	Tip jacks, green	Connection points for test narrow band audio input signal



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Figure 3-4. Test Adapter, MX-8152/TYA-11, Operating Controls, Indicators, Connectors, and Test Points

TABLE 3-4. TEST ADAPTER, MX-8152/TYA-11,
OPERATING CONTROLS, INDICATORS, CONNECTORS, AND TEST POINTS

ITEM	TYPE	FUNCTION
Plug P1 (located on top of Test Adapter)	Connector assembly	Routes test signals and voltages between Test Adapter and Antenna Coupler, CU-1406/GRC, under test
Plug P2 (located on top of Test Adapter)	Connector assembly	Routes output signals of Antenna Coupler, CU-1406/GRC, to front panel test points on Test Adapter
Plug P3 (located on top of Test Adapter)	Connector assembly	Mates with primary ac power source to provide test fixture with 115 vac, 400 cps, ØA and ØB power
Jack J1 (located on top of Test Adapter)	Connector	Interconnects test fixture with Radio Set Control, C-3811/AR, through Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11
AC ON/OFF circuit breaker CB1	Circuit breaker	In ON position applies primary ac power to the Test Adapter
AC indicator DS1	Lamp	When lighted indicates primary ac power is applied to Test Adapter
DC ON/OFF circuit breaker CB2	Circuit breaker	In ON position distributes Test Adapter generated dc voltages (+28 vdc and -18 vdc) to Test Adapter circuits and to Antenna Coupler under test
DC indicator DS2	Lamp	When lighted indicates dc power is applied to Test Adapter
Test points (not indexed): A/TENS test jack J4	Tip jack, white	Test point for monitoring tens digits frequency selection voltage applied to cavity under test from Radio Set Control, C-3811/AR
C/UNITS test jack J5	Tip jack, white	Test point for monitoring units digit frequency selection voltage applied to cavity under test from Radio Set Control, C-3811/AR
E/TENTHS test jack J6	Tip jack, white	Test point for monitoring tenths digit frequency selection voltage applied to cavity under test from Radio Set Control, C-3811/AR

TABLE 3-4. (Continued)

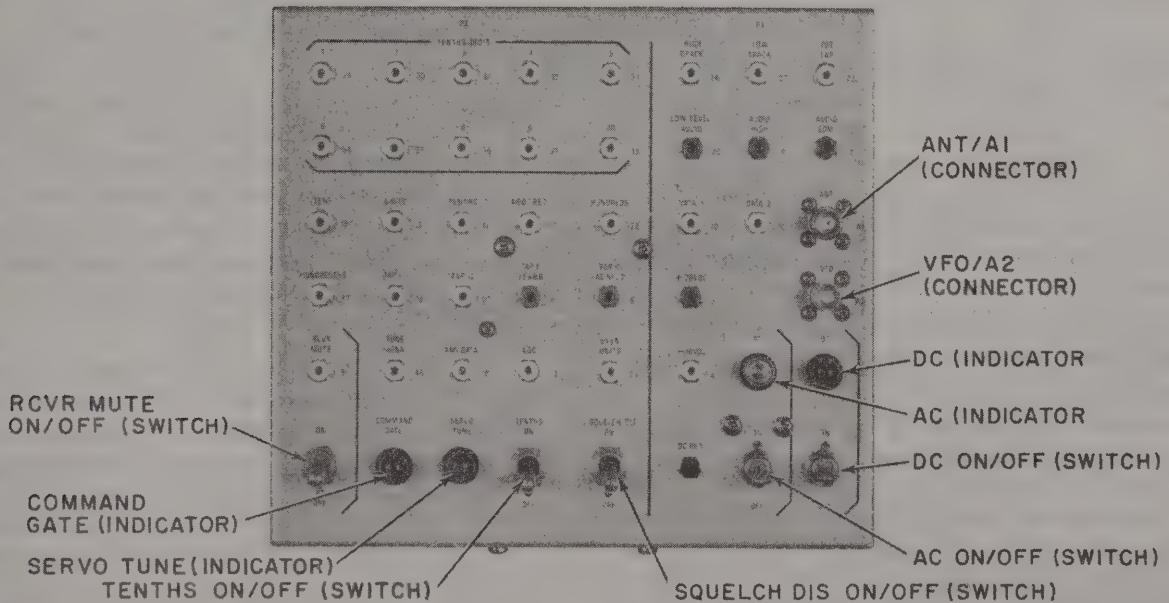
ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
G/ADD RET test jack J10	Tip jack, white	Test point for monitoring adder return reference level output of Radio Set Control, C-3811/AR
N/HIGH TRACK test jack J18	Tip jack, white	Test point for monitoring high track (tap 12) output of Radio Set Control, C-3811/AR, to followup potentiometer of cavity under test
R/POT TAP test jack J17	Tip jack, white	Test point for monitoring reference level applied to followup potentiometer in cavity under test. (Tap 11 reference level when hundredths digit a 2, adder return level when hundredths digit a 3)
T/LOW TRACK test jack J16	Tip jack, white	Test point for monitoring low-level reference level applied to followup potentiometer in cavity under test. (115 vac, ØB when hundredths digit a 3, adder return reference level when hundredths digit a 2)
S/HUNDREDS test jack J11	Tip jack, white	Test point for monitoring hundreds digit frequency selection voltage applied to cavity under test from Radio Set Control, C-3811/AR
L/SERVO MAL test jack J22	Tip jack, white	Test point for monitoring servo malfunction output of cavity under test (normally open ground while cavity is tuning)
e/TENTHS SERVO test jack J23	Tip jack, white	Test point for monitoring tenths servo-command gate of cavity under test
h/SERVO POS test jack J24	Tip jack, white	Test point for monitoring servo positioning output signal from cavity under test (normally open ground when servo is positioning)
M/HUNDREDTHS test jack J12	Tip jack, white	Test point for monitoring hundredths digit output level from Radio Set Control, C-3811/AR, (ground when hundredths digit a 2, open when hundredths digit a 3)

TABLE 3-4. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed); (Cont)		
W/28VDC test jack J25	Tip jack, red	Test point for monitoring regulated +28 vdc output of the Test Adapter
X/DC RET test jack J26	Tip jack, black	Dc return (ground)
p/TAP 13 test jack J27	Tip jack, white	Ground
j/TAP 11 test jack J28	Tip jack, white	Test point for monitoring tap 11 reference voltage output of Radio Set Control, C-3811/AR
c/ØA test jack J29	Tip jack, gray	Test point for monitoring 115 vac, 400 cps, ØA input to Radio Set Control, C-3811/AR, and +28 vdc power supply in the Test Adapter
d/ØB test jack J30	Tip jack, gray	Test point for monitoring 115 vac, 400 cps, ØB input to Radio Set Control, C-3811/AR and Antenna Coupler, CU-1406/GRC, under test
b/AC RET test jack J31	Tip jack, gray	Ac return (ground)
A/CAV 1 LOW PWR test jack J32	Tip jack, white	Test point for monitoring low power output level of cavity 1 in Antenna Coupler, CU-1406/GRC
B/CAV 1 28V RET test jack J2	Tip jack, white	Test point for monitoring +28 vdc output of cavity 1 in Antenna Coupler, CU-1406/GRC
C/CAV 1 28 VDC test jack J3	Tip jack, white	Ground
J/CAV 2 LOW PWR test jack J7	Tip jack, white	Test point for monitoring output level of cavity 2 in Antenna Coupler, CU-1406/GRC
G/CAV 2 28V RET test jack J8	Tip jack, white	Test point for monitoring +28 vdc output of cavity 2 in Antenna Coupler, CU-1406/GRC
H/CAV 2 28 VDC test jack J9	Tip jack, white	Ground
L/CAV 3 LOW PWR test jack J13	Tip jack, white	Test point for monitoring low power output level of cavity 2 in Antenna Coupler, CU-1406/GRC

TABLE 3-4. (Continued)

ITEM	TYPE	FUNCTION
M/CAV 3 28V RET test jack J14	Tip jack, white	Test point for monitoring +28 vdc output of cavity 3 in Antenna Coupler, CU-1406/GRC
N/CAV 3 28 VDC test jack J15	Tip jack, white	Ground
R/CAV 4 LOW PWR test jack J19	Tip jack, white	Test point for monitoring low power output level of cavity 4 in Antenna Coupler, CU-1406/GRC
S/CAV 4 28V RET test jack J20	Tip jack, white	Test point for monitoring +28 vdc output of cavity 4 in Antenna Coupler, CU-1406/GRC
T/CAV 4 28 VDC test jack J21	Tip jack, white	Ground



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Figure 3-5. Test Set Coupler, MX-8153/TYA-11, Operating Controls, Indicators, Connectors, and Test Points

TABLE 3-5. TEST SET COUPLER, MX-8153/TYA-11,
OPERATING CONTROLS, INDICATORS, CONNECTORS, AND TEST POINTS

ITEM	TYPE	FUNCTION
Jack J3 (located on top of Test Set Coupler)	Connector	Interconnects Test Set Coupler with Radio Set Control, C-3811/AR, thru Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11
Jack J2 (located on top of Test Set Coupler)	Connector assembly	Provides signal and voltage distribution between Test Set Coupler and connector A1A1P2 on Synthesizer-Receiver under test
Jack J1 (located on top of Test Set Coupler)	Connector assembly	Provides signal and voltage distribution between Test Set Coupler and connector A1A1P1 on Synthesizer-Receiver under test
Plug P1 (located on top of Test Set Coupler)	Connector assembly	Provides interconnection to primary power supply (115 vac, 400 cps, ϕ A and ϕ B)
ANT connector J38	Connector, BNC	Connection point for applying simulated audio input signal to Synthesizer-Receiver under test
VFO connector J39	Connector, BNC	Test point for monitoring
AC indicator DS1	Lamp	When lighted indicates primary ac power is applied to Test Set Coupler
DC indicator DS2	Lamp	When lighted indicates Test Set Coupler generated dc power (+28 vdc and -18 vdc) is being distributed to Test Set Coupler and unit under test
AC ON/OFF circuit breaker CB2	Circuit breaker	In ON position applies primary ac power to Test Set Coupler
DC ON/OFF circuit breaker CB1	Circuit breaker	In ON position distributes dc power to Test Set Coupler and unit under test
SQUELCH DIS ON/OFF switch S1	Switch, toggle, spdt	In ON position applies ground level to wiper of VO SQUELCH MN potentiometer R2 which disables squelch control circuit of Synthesizer-Receiver under test

TABLE 3-5. (Continued)

ITEM	TYPE	FUNCTION
TENTHS ON/OFF switch S2	Switch, toggle, spdt	In ON position applies ground level (servo command grd) to pin 41 of Synthesizer-Receiver under test
SERVO TUNE indicator DS3	Lamp	When lighted indicates Synthesizer-Receiver under test is producing servomotor drive signal
COMMAND GATE indicator DS4	Lamp	When lighted indicates Synthesizer-Receiver under test is stepping to new test frequency
RCVR MUTE ON/OFF switch S3	Switch, toggle, dpdt	In ON position applies 400 cps tone signal and -18v receiver protect signal to Synthesizer-Receiver under test
Test points (not indexed): P1-14/HIGH TRACK test jack J25	Tip jack, white	Test point for monitoring high track output of unit under test
P1-22/LOW TRACK test jack J26	Tip jack, white	Test point for monitoring low track output of unit under test
P1-23/POT TAP test jack J27	Tip jack, white	Test point for monitoring tap function voltage output of Synthesizer-Receiver under test
P1-29/LOW LEVEL AUDIO test jack J32	Tip jack, green	Test point for monitoring low level audio output of Synthesizer-Receiver under test
P1-19/AUDIO HIGH test jack J33 and P1-17/AUDIO COM test jack J34	Tip jacks, green	Test points for monitoring amplified audio output of Synthesizer-Receiver under test
P1-12/DATA 1 test jack J28	Tip jack, white	Test point for monitoring FSK data 1 output of Synthesizer-Receiver under test
P1-10/DATA 2 test jack J29	Tip jack, white	Test point for monitoring FSK data 2 (complement of FSK data 1) output of Synthesizer-Receiver under test
P1-3/+28VDC test jack J35	Tip jack, red	Test point for monitoring regulated +28 vdc output of the Test Set Coupler

TABLE 3-5. (Continued)

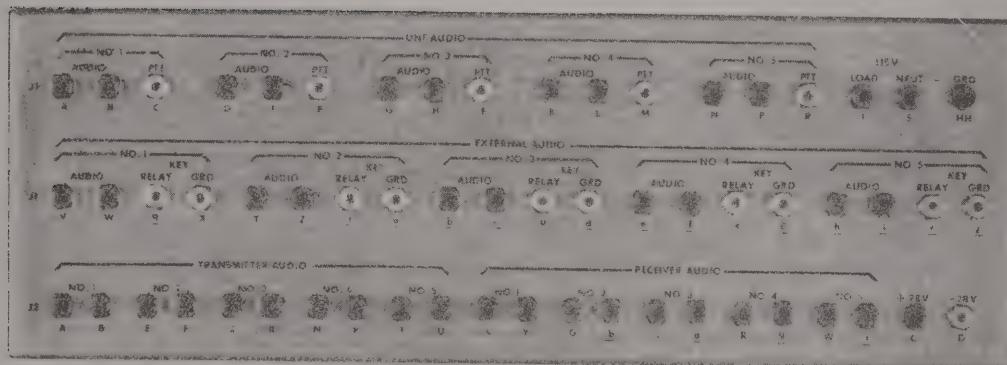
ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
P1-4/-18VDC test jack J36	Tip jack, white	Test point for monitoring -18 vdc output of the Test Set Coupler
P1-1/DC RET test jack J37	Tip jack, black	Ground
P2-29/TENTHS DIGIT 1 test jack J40	Tip jack, white	Test point for monitoring tenths digit 1 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-30/TENTHS DIGIT 2 test jack J41	Tip jack, white	Test point for monitoring tenths digit 2 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-31/TENTHS DIGIT 3 test jack J4	Tip jack, white	Test point for monitoring tenths digit 3 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-32/TENTHS DIGIT 4 test jack J5	Tip jack, white	Test point for monitoring tenths digit 4 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-33/TENTHS DIGIT 5 test jack J6	Tip jack, white	Test point for monitoring tenths digit 5 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-34/TENTHS DIGIT 6 test jack J7	Tip jack, white	Test point for monitoring tenths digit 6 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-35/TENTHS DIGIT 7 test jack J8	Tip jack, white	Test point for monitoring tenths digit 7 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-36/TENTHS DIGIT 8 test jack J9	Tip jack, white	Test point for monitoring tenths digit 8 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-37/TENTHS DIGIT 9 test jack J10	Tip jack, white	Test point for monitoring tenths digit 9 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-38/TENTHS DIGIT 10 test jack J11	Tip jack, white	Test point for monitoring tenths digit 10 input to Synthesizer-Receiver from Radio Set Control, C-3811/AR

TABLE 3-5. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
P2-15 TENS test jack J12	Tip jack, white	Test point for monitoring tens digit frequency selection voltage to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-13/UNITS test jack J13	Tip jack, white	Test point for monitoring units digit frequency selection voltage input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-11/TENTHS test jack J14	Tip jack, white	Test point for monitoring tenths digit frequency selection voltage input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-17/ADD RET test jack J15	Tip jack, white	Test point for monitoring reference level output of Synthesizer-Receiver under test
P2-22/HUNDREDS test jack J16	Tip jack, white	Test point for monitoring hundreds digit output of Synthesizer-Receiver under test (ground when hundreds digit a 2, open when hundreds digit a 3)
P2-47/HUNDREDTHS test jack J17	Tip jack, white	Test point for monitoring hundredths digit input to Synthesizer-Receiver from Radio Set Control, C-3811/AR (+28 vdc when hundredths digit is 5)
P2-25/TAP 11 test jack J18	Tip jack, white	Test point for monitoring tap 11 reference level input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-27/TAP 12 test jack J19	Tip jack, white	Test point for monitoring tap 12 reference level input to Synthesizer-Receiver from Radio Set Control, C-3811/AR
P2-7/TAP 1 (115V ØB test jack J30	Tip jack, gray	Test point for monitoring 115 vac, 400 cps, ØB input to Radio Set Control from Synthesizer-Receiver under test
P2-8/TAP 13 (AC NEUT) test jack J31	Tip jack, gray	Ground
P2-51/RCVR MUTE test jack J20	Tip jack, white	Test point for monitoring receiver mute input to Synthesizer-Receiver under test (-18 vdc when RCVR MUTE ON/OFF switch on Test Set Coupler is in ON position)

TABLE 3-5. (Continued)

ITEM	TYPE	FUNCTION
P2-46/TUNE SIGNAL test jack J21	Tip jack, white	Test point for monitoring servo tune signal to Synthesizer-Receiver under test (400 cps tone when RCVR MUTE ON/OFF switch is in ON position)
P2-19/AM/DATA test jack J22	Tip jack, white	Test point for monitoring voice data control input to Synthesizer-Receiver under test (ground when AM/FM switch on Radio Set Control, C-3811/AR is in AM. position.
P2-20/AGC test jack J23	Tip jack, white	Test point for monitoring AGC output of Synthesizer-Receiver under test
P2-28/EVEN UNITS test jack J24	Tip jack, white	Test point for monitoring even units input to Synthesizer-Receiver from Radio Set Control, C-3811/AR (ground when units digit are 0, 2, 4, 6, or 8)



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Figure 3-6. Test Adapter, MX-8158/TYA-11. Test Points and Connectors

TABLE 3-6. TEST ADAPTER, MX-8158/TYA-11, TEST POINTS AND CONNECTORS

ITEM	TYPE	FUNCTION
Plug P1 (located on top of Test Adapter)	Connector assembly	Routes signals and voltages between Test Adapter and Communications Central Group, AN/TYA-11, thru Cable Assembly W62, ECI 12-01189-001
Plug P2 (located on top of Test Adapter)	Connector assembly	Routes signals and voltages between Test Adapter and Communications Central Group, AN/TYA-11, thru Cable Assembly W70, ECI 12-01191-001
Plug P3 (located on top of Test Adapter)	Connector assembly	Routes signals and voltages between Test Adapter and Five Channel Audio Amplifier-Converter, ECI 01-00730-001
Plug P4 (located on top of Test Adapter)	Connector assembly	Routes signals and voltages between Test Adapter and Five Channel Audio Amplifier-Converter, ECI 01-00730-001
Test points (not indexed): UHF AUDIO/NO. 1/ J1-A and -B/AUDIO test jacks J1 and J2	Tip jacks, green	Test points for monitoring input or output signals at pins 9 and 10 of audio frequency amplifier board no. 1
J1-C/PTT test jack J3	Tip jack, white	Test point for monitoring transmit key output at pin 16 of audio frequency amplifier board no. 1 (ground when associated radio is in transmit mode)
UHF AUDIO/NO. 2/ J1-D and -E/AUDIO test jacks J4 and J5	Tip jacks, green	Test points for monitoring input or output signals at pins 9 and 10 of audio frequency amplifier board no. 2
J1-F/PTT test jack J6	Tip jack, white	Test point for monitoring transmit key output at pin 16 of audio frequency amplifier board no. 2 (ground when associated radio is in transmit mode)
UHF AUDIO/NO. 3/ J1-G and -H/AUDIO test jacks J7 and J8	Tip jacks, green	Test points for monitoring input or output signals at pins 9 and 10 of audio frequency amplifier board no. 3

TABLE 3-6. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed) (Cont)		
UHF AUDIO/NO. 3/ (Cont)		
J1-J/PTT test jack J9	Tip jack, white	Test point for monitoring transmit key output at pin 16 of audio frequency amplifier board no. 3 (ground when associated radio is in transmit mode)
UHF AUDIO/NO. 4/ J1-K and -L/AUDIO test jacks J10 and J11	Tip jacks, green	Test points for monitoring inputs or output signals at pins 9 and 10 of audio frequency amplifier board no. 4
J1-M/PTT test jack J12	Tip jack, white	Test point for monitoring transmit key output of audio frequency amplifier board no. 4 (ground when associated radio in transmit mode)
UHF AUDIO/NO. 5/ J1-N and -P/AUDIO test jacks J13 and J14	Tip jacks, green	Test points for monitoring input or output signals at pins 9 and 10 of audio frequency amplifier board no. 2
J1-R/PTT test jack J15	Tip jack, white	Test point for monitoring transmit key output of audio frequency amplifier board no. 5 (ground when associated radio in transmit mode)
J1-T/115V LOAD test jack J16	Tip jack, gray	Test point for monitoring 115 vac, 400 cps input to Audio Amplifier-Converter
J1-S/115V NEUT test jack J17	Tip jack, gray	Ac neutral
J1-HH/GRD test jack J18	Tip jack, black	System ground
EXTERNAL AUDIO/NO. 1/		
J1-V and -W/AUDIO test jacks J19 and J20	Tip jacks, green	Test points for monitoring external audio input to pins 1 and 3 of audio frequency amplifier board no. 1

TABLE 3-6. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed) (Cont)		
EXTERNAL AUDIO/ NO. 1/(Cont)		
J1-q/KEY RELAY test jack J21	Tip jack, white	Test point for monitoring input to key relay K1 on audio frequency amplifier board no. 1 (when ground, relay K1 is energized).
J1-X/KEY GRD test jack J22	Tip jack, white	Dc return (ground)
EXTERNAL AUDIO/ NO. 2/		
J1-Y and -Z/AUDIO test jacks J23 and J24	Tip jacks, green	Test points for monitoring external audio input to pins 1 and 3 of audio frequency amplifier board no. 2
J1-t/KEY RELAY test jack J25	Tip jack, white	Test point for monitoring input to key relay K1 on audio frequency amplifier board no. 2 (when ground, relay K1 is energized).
J1-a/KEY GRD test jack J26	Tip jack, white	Dc return (ground)
EXTERNAL AUDIO/ NO. 3/		
J1-b and -c/AUDIO test jacks J27 and J28	Tip jacks, green	Test points for monitoring external audio input to pins 1 and 3 of audio frequency amplifier board no. 3
J1-u/KEY RELAY test jack J29	Tip jack, white	Test point for monitoring input to key relay K1 on audio frequency amplifier board no. 3 (ground when relay K1 is energized).
J1-d/KEY GRD test jack J30	Tip jack, white	Dc return (ground)
EXTERNAL AUDIO/ NO. 4/		
J1-e and -f/AUDIO test jacks J31 and J32	Tip jacks, green	Test points for monitoring external audio inputs to pins 1 and 3 of audio frequency amplifier board no. 4

TABLE 3-6. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
EXTERNAL AUDIO/ NO. 4/ J1-x/KEY RELAY test jack J33	Tip jack, white	Test point for monitoring input to key relay K1 on audio frequency amplifier board no. 4 (when ground, relay K1 is energized).
J1-g/KEY GRD test jack J34	Tip jack, white	Dc return (ground)
EXTERNAL AUDIO/ NO. 5/ J1-h and -i/AUDIO test jacks J35 and J36	Tip jacks, green	Test points for monitoring external audio inputs to pins 1 and 3 of audio frequency amplifier board no. 5
J1-y/KEY RELAY test jack J37	Tip jack, white	Test point for monitoring input to key relay K1 on audio frequency amplifier board no. 5 (when ground, relay K1 is energized).
J1-j/KEY GRD test jack J38	Tip jack, white	Dc return (ground)
TRANSMITTER AUDIO/ J2-A and -B/NO. 1 test jacks J39 and J40	Tip jacks, white	Test points for monitoring input and output signals at pins 19 and 20 of audio frequency amplifier board no. 1
J2-E and -F/NO. 2 test jacks J41 and J42	Tip jacks, white	Test points for monitoring input or output signals at pins 19 and 20 of audio frequency amplifier board no. 5
J2-J and -K/NO. 3 test jacks J43 and J44	Tip jacks, white	Test points for monitoring input or output signals at pins 19 and 20 of audio frequency amplifier board no. 3
J2-N and -P/NO. 4 test jacks J45 and J46	Tip jacks, white	Test points for monitoring signals input or output at pins 19 and 20 of audio frequency amplifier board no. 4
J2-T and -U/NO. 5 test jacks J47 and J48	Tip jacks, white	Test points for monitoring input or output signals at pins 19 and 20 of audio frequency amplifier board no. 5

TABLE 3-6. (Continued)

ITEM	TYPE	FUNCTION
Test points (not indexed): (Cont)		
RECEIVER AUDIO/ J2-X and -Y/NO. 1 test jacks J49 and J50	Tip jacks, white	Test points for monitoring input or output signals at pins 24 and 26 of audio frequency amplifier board no. 1
J2-G and -b/NO. 2 test jacks J51 and J52	Tip jacks, white	Test points for monitoring input or output signals at pins 24 and 26 of audio frequency amplifier board no. 2
J2-L and -d/NO. 3 test jacks J53 and J54	Tip jacks, white	Test points for monitoring input or output signals at pins 24 and 26 of audio frequency amplifier board no. 3
J2-R and -g/NO. 4 test jacks J55 and J56	Tip jacks, white	Test points for monitoring input or output signals at pins 24 and 26 of audio frequency amplifier board no. 4
J2-W and -i/NO. 5 test jacks J57 and J58	Tip jacks, white	Test points for monitoring input or output signals at pins 24 and 26 of audio frequency amplifier board no. 5
J2-C/+28V test jack J59	Tip jack, red	+28 vdc test point
J2-D/-28V test jack J60	Tip jack, white	+28 vdc return

(7) Radio Set Control, C-3811/AR, (part of Communications Test Kit, MK-1102/TYA-11). Figure 3-7 identifies all controls and connectors used in operation of Radio Set Control, C-3811/AR. The function of each control and connector is described in Table 3-7.

b. INDICATOR PRESENTATIONS. Indicator presentations associated with the operating procedures contained in this manual consist of status indications provided by indicator lamps on Test Set Coupler, MX-8154/TYA-11, and test items Communications Test Kit, MK-1102/TYA-11, and status indications, display readouts, and meter readings provided by indicators on the specific unit under test. The presentations provide the operator with a means of monitoring operational status of the test equipment and

unit under test and for evaluating results of specific test procedures. The locations and functions of all indicators contained on the Test Set Coupler and test items of Communications Test Kit are identified in paragraph 3-3a. For the location and function of indicators on the AN/TYA-11 units tested, refer to the applicable instruction manual (see Table 1-5). For expected indications during operation refer to the applicable portions of the operating procedures presented in paragraphs 3-3d and 3-3e.

c. TUNING AND ADJUSTMENT. There are no operator performed tuning or adjustment procedures for Test Set Coupler, MX-8154/TYA-11 or Communications Test Kits, MK-1102/TYA-11, and MK-1104/TYA-11.

d. TEST SET COUPLER, MX-8154/TYA-11, OPERATING PROCEDURES. The following paragraphs provide complete instructions for testing the below listed assemblies of Communications Central Group, AN/TYA-11, using Test Set Coupler, MX-8154/TYA-11:

1. Radio Set Control Assembly, ECI 01-00507-001

2. Indicator Test Electrical Assembly, ECI 01-00508-001

3. DC Power Supply, ECI 01-00509-001

4. Five Channel Audio Amplifier-Converter, ECI 01-00730-001

5. Communications Central Group Control, C-8019/TYA-11.

(1) Radio Set Control Assembly, ECI 01-00507-001, Test Procedures. Operating instructions for using Test Set Coupler, MX-8154/TYA-11, to test Radio Set Control Assembly, ECI 01-00507-001, of Communications Central Group, AN/TYA-11, are composed of a list of ancillary test equipment, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required for operation of the Test Set Coupler when testing Radio Set Control Assembly:

1. Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001 (part of Test Set Coupler)

2. Branched Special Purpose Electrical Cable Assembly W1, ECI 12-01286-001 (part of Test Set Coupler)

3. Branched Special Purpose Electrical Cable Assembly W3, ECI 12-01288-001 (part of Test Set Coupler)

4. Signal Generator, AN/URM-127

5. Electronic Voltmeter, ME-30B.

(b) Test Setup. To prepare the Test Set Coupler for testing Radio Set Control Assembly, proceed as follows:

1 On Test Set Coupler turn all front panel rotary switches to the OFF or 1 position as applicable and set all circuit breaker switches to the off (down) position.

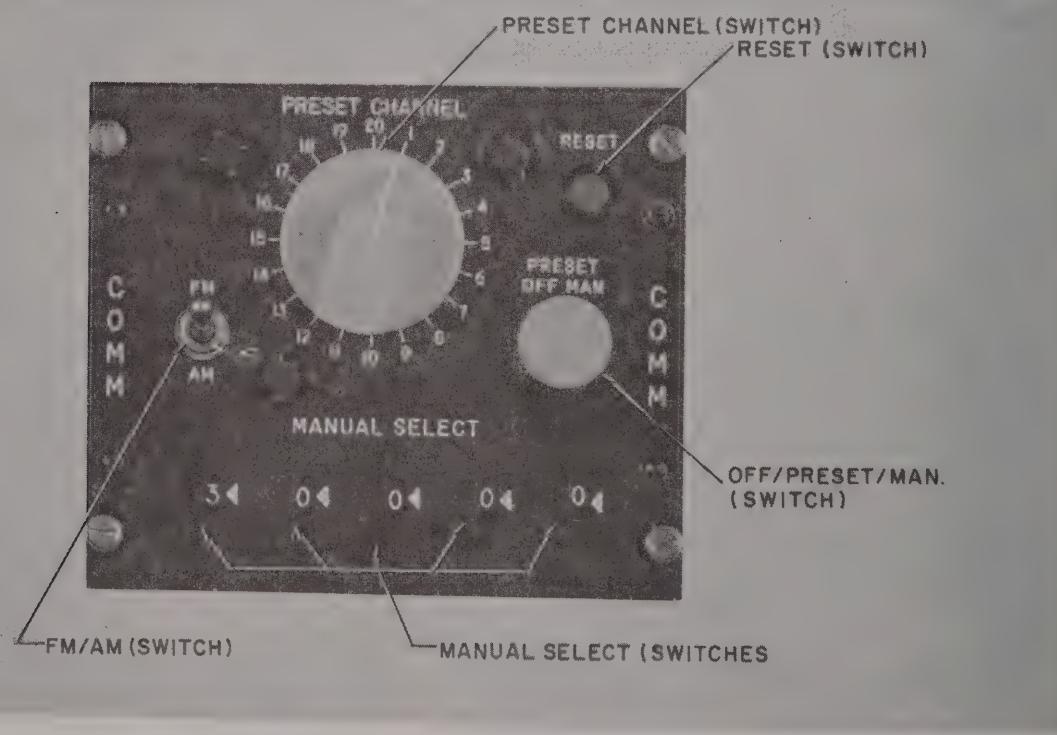


Figure 3-7. Radio Set Control, C-3811/AR, Operating Controls

TABLE 3-7. RADIO SET CONTROL, C-3811/AR, OPERATING CONTROLS

ITEM	TYPE	FUNCTION
Plug J1401 (not shown)	Connector	Routes input and output test signals and voltages between Radio Set Control and either Test Adapter, MX-8152/TYA-11 or Test Set Coupler, MX-8153/TYA-11
PRESET CHANNEL switch S1401	Switch, rotary drum, 20-position	Provides for operator selection of any 1 of 20 preprogramed frequency channels in 225.00 to 399.95 mcs range when OFF/PRESET/MANUAL switch S1403 is in PRESET position
RESET switch S1402	Switch, pushbutton	When pressed removes ground return from odd/even relay in Synthesizer-Receiver under test causing a 50 kc/s shift in selected frequency. Not used in testing Antenna Coupler, CU-1406/GRC.
OFF/PRESET/MAN switch S1403	Switch, rotary 3-position, 10 wafer	Controls mode of frequency selection; in PRESET position activates PRESET selector switch, in MANUAL position allows operator to select test frequencies by means of MANUAL SELECT thumbwheel switches
MANUAL SELECT switches S1404 thru S1407 and S1409	Switches, thumbwheel	Provides means of manually selecting any of 3500 channels in the range of 225 to 399.95 mcs
FM/AM switch S1408	Switch, toggle	Provides operator control of voice/data switching when testing Synthesizer-receivers, O-1282(V)/GRC. Switch S1408 not used for testing Antenna Coupler, CU-1406/GRC.

2 On Radio Set Control Assembly set front panel control switches as follows:

Switch	Position
All front panel toggle switches	Down
RADIO 1-4 CHANNEL SELECTOR switches	1
RADIO 1 OPR ACCESS through RADIO 4 OPR ACCESS switches	OFF

3 Connect Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001, between

Test Set Coupler POWER connector and the primary ac power source (115 vac, 400 cps, single phase).

4 Connect Branched Special Purpose Electrical Cable Assembly W3, ECI 12-01288-001, between Test Set Coupler connector J3 and connectors J3, J4, J5, and J6 on the Radio Set Control Assembly.

5 Connect a test lead between the GRD (ground) lug on the Test Set Coupler and earth ground.

6 Connect Branched Special Purpose Electrical Cable Assembly W1 between Test Set Coupler connector J1 and connectors J1 and J2 on the Radio Set Control Assembly.

(c) Operating Procedures. The operating procedures for using Test Set Coupler for testing Radio Set Control Assembly, are provided in Table 3-8. If an abnormal indication is observed refer to the troubleshooting procedures for Radio Set Control Assembly, ECI 01-00507-001 contained in Section 4 of TM-04165A-35/2-1, Maintenance and Overhaul Manual Communications Central Group, AN/TYA-11.

Note

ALL CONTROLS AND INDICATORS REFERENCED IN TABLE 3-8 ARE LOCATED ON TEST SET COUPLER, MX-8154/TYA-11, UNLESS OTHERWISE SPECIFIED.

(2) Indicator Test Electrical Assembly, ECI 01-00508-001, Test Procedures. Operating instructions for using Test Set Coupler, MX-8154/TYA-11, to test Indicator Test Electrical Assembly, ECI 01-00508-001, are composed of a list of ancillary test equipment, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required for operation of the Test Set Coupler when testing Indicator Test Electrical Assembly:

1. Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001

2. Branched Special Purpose Electrical Cable Assembly W2, ECI 12-01287-001

3. Branched Special Purpose Electrical Cable Assembly W4, ECI 12-01289-001

4. Oscilloscope, Fairchild 765MH

5. Plug-in Unit, Fairchild 74-11A

6. Plug-in Unit, Fairchild 76-02A.

(b) Test Setup. To prepare the Test Set Coupler for testing Indicator Test Electrical Assembly, proceed as follows:

1 On Test Set Coupler, turn all front panel rotary switches to the OFF or 1 position,

as applicable, and set all circuit breaker switches to the OFF (down) position.

2 On Indicator Test Electrical Assembly, set front panel switches as indicated below:

Switch	Position
MODE SELECT RADIO NO.1	DATA
MODE SELECT RADIO NO.2	DATA
MODE SELECT RADIO NO.3	DATA
MODE SELECT RADIO NO.4	DATA
MODE SELECT RADIO NO.5	EXT
TEST KEY SEL	1
RATE 5 KC/10 KC	5 KC
MSG NORM/INVERT	NORM
MSG ON/OFF	OFF
RISE TIME SEL USEC	OFF

3 Connect Special Purpose Electrical Cable Assembly W8 between the Test Set Coupler POWER connector and the primary ac power source.

4 Connect Branched Special Purpose Electrical Cable Assembly W2 between Test Set Coupler connector J2 and connectors J1, J2, J3, and J5 on Indicator Test Electrical Assembly.

5 Connect Special Purpose Electrical Cable Assembly W4 between Test Set Coupler connector J4 and connector J4 on Indicator Test Electrical Assembly.

6 Connect a test lead between GRD (ground) connector on the Test Set Coupler and earth ground.

(c) Operating Procedures. The operating procedures for using Test Set Coupler to test Indicator Test Electrical Assembly, are provided in Table 3-9. If an abnormal indication is observed refer to the troubleshooting procedures for Indicator Test Electrical Assembly, ECI 01-00508-001, as provided in Section 4 of TM-04165-A-35/2-1, Maintenance and Overhaul Manual for Communications Central Group, AN/TYA-11.

Note

ALL CONTROLS AND INDICATORS REFERENCED IN TABLE 3-9 ARE LOCATED ON TEST SET COUPLER MX-8154/TYA-11, UNLESS OTHERWISE SPECIFIED.

(3) DC Power Supply, ECI 01-00509-001, Test Procedure. Operating instructions for using Test Set Coupler, MX-8154/TYA-11, to test DC Power Supply, ECI 01-00509-001, are composed of a list of ancillary, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required for operation of Test Set Coupler when testing DC Power Supply:

1. Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001

2. Branched Special Purpose Electrical Cable Assembly W5, ECI 12-01290-001

3. Electronic Multimeter, AN/USM-116.

(b) Test Setup. To prepare the Test Set Coupler for testing a DC Power Supply, proceed as follows:

1 On Test Set Coupler, turn all front panel rotary switches to the OFF or 1 position as applicable and set all circuit breaker switches to the OFF (down) position.

2 Connect Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001 between the Test Set Coupler POWER connector and the primary ac power source.

3 Connect Branched Special Purpose Electrical Cable Assembly W5 between Test Set Coupler connector J4 and the DC Power Supply input connector.

4 Connect Electronic Multimeter, AN/USM-116, to Test Set Coupler OUTPUT test jacks (DC meter lead to red test jack and COMMON meter lead to black test jack) and turn vtvpm polarity selector to +.

5 Connect a test lead between GRD (ground) lug on the Test Set Coupler and earth ground.

(c) Operating Procedures. The operating procedures for using Test Set Coupler to test DC Power Supply, are provided in Table 3-10. If an abnormal indication is observed refer to the troubleshooting procedures for DC Power Supply, ECI 01-00509-001 as provided in Section 4 of TM-04165A-35/2-1, Maintenance and

Overhaul Manual for Communications Central Group, AN/TYA-11.

Note

ALL CONTROLS AND INDICATORS REFERENCED IN TABLE 3-10 ARE LOCATED ON TEST SET COUPLER, MX-8154/TYA-11, UNLESS OTHERWISE SPECIFIED.

(4) Five Channel Audio Amplifier-Converter, ECI 01-00730-001, Test Procedure. Operating instructions for using Test Set Coupler, MX-8154/TYA-11, to test Audio Amplifier-Converter, ECI 01-00730-001, are composed of a list of ancillary test equipment, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required for operation of Test Set Coupler when testing Audio-Amplifier-Converter:

1. Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001

2. Branched Special Purpose Electrical Cable Assembly W7, ECI 12-01292-001

3. Digital Voltmeter, HP-3440A

4. Signal Generator, AN/URM-127

5. Electronic Voltmeter, ME-30(B), (2).

(b) Test Setup. To prepare the Test Set Coupler for testing an Audio Amplifier-Converter proceed as follows:

1 On Test Set Coupler, turn all front panel rotary switches to the OFF or 1 position, as applicable, and set all circuit breaker switches to the OFF (down) position.

2 Connect Special Purpose Electrical Cable Assembly W8 between the Test Set Coupler POWER connector and the primary ac power source.

3 Connect Branched Special Purpose Electrical Cable Assembly W7 between Test Set Coupler connector J6 and connectors J1 and J2 on Audio Amplifier-Converter.

4 Connect Digital Voltmeter, HP-3440A, to the Test Set Coupler OUTPUT test jacks (+ lead to red test jack and - lead to black test jack).

5 Connect a test lead between GRD (ground) lug on the Test Set Coupler and earth ground.

TABLE 3-8. OPERATING INSTRUCTIONS FOR TEST SET COUPLER,
MX-8154/TYA-11, WHEN TESTING RADIO SET CONTROL ASSEMBLY, ECI 01-00507-001

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	Set AC POWER ON/OFF circuit breaker to ON.		AC POWER indicator lights:
2	Set DC POWER ON/OFF circuit breaker to ON.		<p>(a) Test Set Coupler indicators:</p> <ol style="list-style-type: none"> 1. DC POWER indicator lights. 2. POWER and CODE 4 indicators light. <p>(b) Radio Set Control Assembly indicators:</p> <ol style="list-style-type: none"> 1. RADIO 1 CHAN NO. indicator displays a 1. 2. RADIO 2 CHAN NO. indicator displays a 2. 3. RADIO 3 CHAN NO. indicator displays a 3. 4. RADIO 4 CHAN NO. indicator displays a 4. 5. RADIO 1 IN USE indicator lights.
3	On Radio Set Control Assembly turn RADIO 1 OPR ACCESS thru RADIO 5 OPR ACCESS switches to TALK position.		RADIO 2 thru RADIO 5 IN USE indicators on Radio Set Control Assembly light.
4	On Radio Set Control Assembly sequentially turn RADIO 1-4 CHANNEL SELECTOR switch to positions 1 thru 0 while monitoring the Test Set Coupler and RADIO 1 indicators on the Radio Set Control Assembly for conditions indicated in NORMAL INDICATION column.		<p>Position 1</p> <p><u>Test Set:</u> CODE 4 indicator lights.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 1.</p> <p>Position 2</p> <p><u>Test Set:</u> CODE 1 indicator lights.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 2.</p>

TABLE 3-8. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
4 (Cont)			<p>Position 3</p> <p><u>Test Set:</u> CODE 2 indicator lights.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 3.</p>
			<p>Position 4</p> <p><u>Test Set:</u> CODE 3 indicator lights.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 4.</p>
			<p>Position 5</p> <p><u>Test Set:</u> CODE 1 and 4 indicators light.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 5.</p>
			<p>Position 6</p> <p><u>Test Set:</u> CODE 1 and 2 indicators light.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 6.</p>
			<p>Position 7</p> <p><u>Test Set:</u> CODE 2 and 3 indicators light.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 7.</p>
			<p>Position 8</p> <p><u>Test Set:</u> CODE 1, 3, and 4 indicators light.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays an 8.</p>
			<p>Position 9</p> <p><u>Test Set:</u> CODE 1, 2, and 4 indicators light.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 9.</p>

TABLE 3-8. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
4 (Cont)			<p>Position 0</p> <p><u>Test Set:</u> CODE 1, 2, and 3 indicators light.</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. displays a 0.</p>
5	Turn RADIO switch to position 2 and repeat step 4 observing RADIO 2 CHAN NO. indicator on Radio Set Control Assembly.		Same as step 4
6	Turn RADIO switch to position 3 and repeat step 4 while observing RADIO 3 CHAN NO. indicator on Radio Set Control Assembly.		Same as step 4
7	Turn RADIO switch to position 4 and repeat step 4 while observing RADIO 4 CHAN NO. indicator on Radio Set Control Assembly.		Same as step 4
8	On Radio Set Control Assembly turn RADIO 1 OPR ACCESS thru RADIO 5 OPR ACCESS switches to OFF and turn RADIO 1-4 CHANNEL SELECTOR switch to 1.		
9	Turn RADIO switch to 1 and momentarily set DC POWER ON/OFF circuit breaker to OFF and then reset to ON.		Test Set Coupler and Radio Set Control Assembly indicators same as step 2
10	Momentarily press OUT OF SERVICE switch.		On Radio Set Control Assembly RADIO 1 thru 4 OUT OF SERVICE indicators light momentarily.
11	Sequentially turn CODE switch to positions 1 thru 11 while observing Test Set Coupler CODE indicators and Radio Set Control Assembly, radio 1 indicators for conditions indicated in NORMAL INDICATION column.		<p>Position 1</p> <p><u>Test Set:</u> CODE 4</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. 1</p> <p>Position 2</p> <p><u>Test Set:</u> CODE 1</p> <p><u>Radio Set Control Assembly:</u> CHAN NO. 2</p>

TABLE 3-8. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
11 (Cont)			Position 3 <u>Test Set: CODE 2</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 3</u> Position 4 <u>Test Set: CODE 3</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 4</u> Position 5 <u>Test Set: CODE 1 and 4</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 5</u> Position 6 <u>Test Set: CODE 1 and 2</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 6</u> Position 7 <u>Test Set: CODE 2 and 3</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 7</u> Position 8 <u>Test Set: CODE 1, 3, and 4</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 8</u> Position 9 <u>Test Set: CODE 1, 2, and 4</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 9</u> Position 10 <u>Test Set: CODE 1, 2, and 3</u> <u>Radio Set Control Assembly:</u> <u>CHAN NO. 0</u>

TABLE 3-8. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
11 (Cont)			<p>Position 11</p> <p><u>Test Set:</u> None</p> <p><u>Radio Set Control Assembly:</u> OUT OF SERVICE and MEMORY MAL indicators light.</p>
12	On Radio Set Control Assembly, turn RADIO 1 OPR ACCESS switch to CHAN position momentarily and then return switch to OFF.		Radio 1 OUT OF SERVICE and MEMORY MAL indicators go off.
13	Turn RADIO switch to position 2 and repeat step 11 while observing radio 2 indicators on the Radio Set Control Assembly.		Same as step 11
14	On Radio Set Control Assembly, RADIO 2 OPR ACCESS switch to CHAN position momentarily and then return switch to OFF.		Radio 2 OUT OF SERVICE and MEMORY MAL indicators go off.
15	Turn RADIO switch to position 3 and repeat step 11 while observing the radio 3 indicators on the Radio Set Control Assembly.		Same as step 11
16	On Radio Set Control Assembly, turn RADIO 3 OPR ACCESS switch to CHAN position momentarily and then return switch to OFF.		Radio 3 OUT OF SERVICE and MEMORY MAL indicators go off.
17	Turn RADIO switch to position 4 and repeat step 11 while observing radio 4 indicators on the Radio Set Control Assembly.		Same as step 11
18	On Radio Set Control Assembly, turn RADIO 4 OPR ACCESS switch to CHAN position momentarily and then return switch to OFF.		Radio 4 OUT OF SERVICE and MEMORY MAL indicators go off.
19	Turn RADIO switch and CODE switch to position 1.		

TABLE 3-8. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
20	Connect Signal Generator, AN/URM-127, and Electronic Voltmeter, ME-30B, across the Test Set Coupler INPUT terminals.		
21	Connect a second electronic voltmeter across Test Set Coupler OUTPUT terminals.		
22	Turn TEST SELECT switch to position 2.		
23	Set Signal Generator for 1 kc/s and adjust for an amplitude of 0.5 volts rms as indicated on electronic voltmeter across INPUT terminals.	OUTPUT test jacks	0.4 to 0.7 volt rms on electronic voltmeter across OUTPUT terminals
24	Sequentially set AUDIO switch to positions 2 thru 5.		On Radio Set Control Assembly, the IN USE indicator corresponding to radio selected lights. Electronic voltmeter across Test Set Coupler OUTPUT terminals indicates 0.5 to 1.0 volts rms for each position of AUDIO switch.
25	Set AUDIO switch to position 1.		
26	Set INPUT switch to position 2.	OUTPUT test jacks	Electronic voltmeter across Test Set Coupler OUTPUT terminals indicates 0.4 to 0.7 volt rms.
27	Momentarily press KEY 1 switch.		KEYING indicator momentarily lights.
28	Sequentially set AUDIO switch to positions 2 thru 5 and repeat step 27 for each position.		On Radio Set Control Assembly, the IN USE indicator associated with position selected lights.
29	Rest AUDIO switch to position 1 and set INPUT switch to position 3.		
30	On Radio Set Control Assembly, set RADIO 1 OPR ACCESS switch to MON position.		

TABLE 3-8. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
31	Adjust output amplitude of audio oscillator for 0.5 volt rms as indicated on electronic voltmeter across Test Set Coupler INPUT terminals.		
32	Turn HANDSET VOLUME control on Radio Set Control Assembly fully clockwise.	OUTPUT test jacks	Electronic voltmeter across Test Set Coupler OUTPUT terminals indicates 0.2 ± 0.075 volts rms.
33	On Radio Set Control Assembly, set RADIO 1 OPR ACCESS switch to TALK.		Radio 1 IN USE indicator on Radio Set Control Assembly goes on while indication of step 32 remains the same.
34	On Radio Set Control Assembly, reset RADIO 1 OPR ACCESS switch to OFF.		
35	Set Test Set Coupler switch to position 2 and repeat steps 30 thru 34 using RADIO 2 OPR ACCESS switch on Radio Set Control Assembly.		Same as steps 30 thru 34 for radio 2 indicators
36	Set Test Set Coupler AUDIO switch to position 3 and repeat steps 30 thru 34 using RADIO 3 OPR ACCESS switch on Radio Set Control Assembly.		Same as steps 30 thru 34 for radio 3 indicators
37	Set Test Set Coupler AUDIO switch to position 4 and repeat steps 30 thru 34 using RADIO 4 OPR ACCESS switch on Radio Set Control Assembly.		Same as steps 30 thru 34 for radio 4 indicators
38	Set Test Set Coupler AUDIO switch to position 5 and repeat steps 30 thru 34 using RADIO 5 OPR ACCESS switch on Radio Set Control Assembly.		Same as steps 30 thru 34 using radio 5 indicators
39	Set INPUT switch to position 4 and AUDIO switch to position 1.		
40	On Radio Set Control Assembly, set RADIO 1 OPR ACCESS switch to TALK.		Radio 1 IN USE indicator lights.

TABLE 3-8. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
41	Set PTT ON/OFF switch to ON.		XMIT and MIKE indicators light.
42	Adjust amplitude of audio oscillator output for 0.5 volts rms as indicated on electronic voltmeter across Test Set Coupler INPUT terminals.	INPUT test jacks	0.1 \pm 0.02 volt rms as indicated on electronic voltmeter connected to Test Set Coupler OUTPUT terminals
43	On Radio Set Control Assembly, set RADIO 1 OPR ACCESS switch to OFF.		
44	Repeat steps 37 thru 40 using RADIO 2 OPR ACCESS switch on Radio Set Control Assembly.		Same as steps 37 thru 40 using radio 2 indicators on Radio Set Control Assembly
45	Repeat steps 37 thru 40 using RADIO 3 OPR ACCESS switch on Radio Set Control Assembly.		Same as steps 37 thru 40 using radio 3 indicators on Radio Set Control Assembly
46	Repeat steps 37 thru 40 using RADIO 4 ACCESS switch on Radio Set Control Assembly.		Same as steps 37 thru 40 using radio 4 indicators on Radio Set Control Assembly
47	Repeat steps 37 thru 40 using RADIO 5 OPR ACCESS switch on Radio Set Control Assembly.		Same as steps 37 thru 40 using radio 5 indicators on Radio Set Control Assembly
48	Set INPUT switch and AUDIO switch to position 1.		
49	Set PTT ON/OFF switch to OFF.		
50	Set AC POWER ON/OFF and DC POWER ON/OFF circuit breakers to OFF.		AC POWER and DC POWER indicators go off.
51	Disconnect all test equipment and test cables.		

TABLE 3-9. OPERATING INSTRUCTIONS FOR TEST SET COUPLER,
MX-8154/TYA-11, WHEN TESTING INDICATOR TEST ELECTRICAL ASSEMBLY, ECI 01-00508-001

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	Set AC POWER ON/OFF circuit breaker to ON.		AC POWER indicator lights.
2	Set DC POWER ON/OFF circuit breaker to ON.		(a) Test Set Coupler DC POWER indicator lights. (b) Following indicators on Indicator Test Electrical Assembly, light: 1. RADIO NO. 1/DATA 2. RADIO NO. 2/DATA 3. RADIO NO. 3/DATA 4. RADIO NO. 4/DATA 5. RADIO NO. 5/DATA 6. ERROR. (c) RF POWER SCALE meter indicates between 1500 and 2000 watts.
3	On Indicator Test Electrical Assembly, set and hold RF POWER 2000/200 switch in 200 position.		RF POWER SCALE meter indicates full scale.
4	Release RF POWER 2000/200 switch.		RF POWER SCALE meter indicates between 1500 and 2000 watts.
5	Press and hold LIGHT TEST MASTER RESET switch.		Following Indicator Test Electrical Assembly indicators light: (a) RADIO NO. 1 thru RADIO NO. 5 XMTR LOW PWR (b) RADIO NO. 1 thru RADIO NO. 4 XMTR CONN (c) RADIO NO. 1 thru RADIO NO. 4 RCVR CONN (d) HUT PWR (e) RSCA PWR (f) AIR COND/PWR NO. 1 (g) AIR COND/PWR NO. 2 (h) AIR COND/MAL.

TABLE 3-9. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
6	Release LIGHT TEST MASTER RESET switch.		
7	Set SELECTOR CHECK switch to 1.		INDICATOR TEST PANEL indicators 3 thru 8 on Test Set Coupler light.
8	Sequentially set SELECTOR CHECK switch to positions 2, 3, and 4.		Same as step 7
9	Reset SELECTOR CHECK switch to position 1.		
10	On Indicator Test Electrical Assembly, set RADIO 1 thru 4 MODE SELECTOR switches to EXT.		<p>a. On the Indicator Test Electrical Assembly RADIO 1 thru RADIO 4 DATA indicators go off and VOICE indicators light.</p> <p>b. On the Test Set Coupler INDICATOR TEST PANEL 7 and 8 indicators go off and 9 and 10 indicators light.</p>
11	Sequentially set SELECTOR CHECK switch to positions 2, 3, and 4.		Same as step 10
12	Reset SELECTOR CHECK switch to position 1.		
13	On Indicator Test Electrical Assembly, turn RADIO 1 thru RADIO 4 MODE SELECTOR switch to RSCA.		INDICATOR TEST PANEL 9 and 10 indicators on Test Set Coupler go off. All other indicators on the Test Set Coupler and Indicator Test Electrical Assembly remain in state established in preceding steps.
14	Sequentially set SELECTOR CHECK switch to positions 2, 3, and 4.		Same as step 13
15	Turn SELECTOR CHECK switch to OFF.		
16	On Indicator Test Electrical Assembly, set RADIO 5 MODE SELECT switch to RSCA.		On Indicator Test Electrical Assembly RADIO 5 VOICE indicator goes off and RADIO 5 TEST indicator lights.
17	On Indicator Test Electrical Assembly, turn RADIO 5 MODE SELECT switch to EXT.		

TABLE 3-9. (Continued)

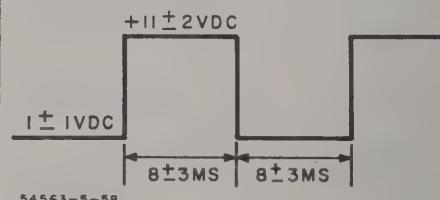
STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
18	On the Test Set Coupler turn TEST KEY switch to position 1.		
19	On Indicator Test Electrical Assembly, momentarily press PUSH TO KEY switch.		INDICATOR TEST PANEL indicator 1 on Test Set Coupler momentarily lights.
20	Sequentially turn Test Set Coupler TEST KEY switch and Indicator Test Electrical Assembly, TEST KEY SELECT switch to positions 2, 3, 4, and 5 and repeat step 19 for common setting of switches.		Same as step 19
21	On Test Set Coupler, turn TEST KEY switch to OFF and turn TEST KEY SELECT switch on Indicator Test Electrical Assembly to position 1.		
22	Connect oscilloscope, Fairchild 765MH, between TIMING terminals on Test Set Coupler.	TIMING test jacks	 54563-5-58
23	Connect oscilloscope EXTERNAL TRIGGER input to SCOPE SYNC terminals on Test Set Coupler.		
24	Monitor indicates test points on Indicator Test Electrical Assembly, for waveshapes and phase relationships as shown below.	TP16 (Timing line 6)	

TABLE 3-9. (Continued)

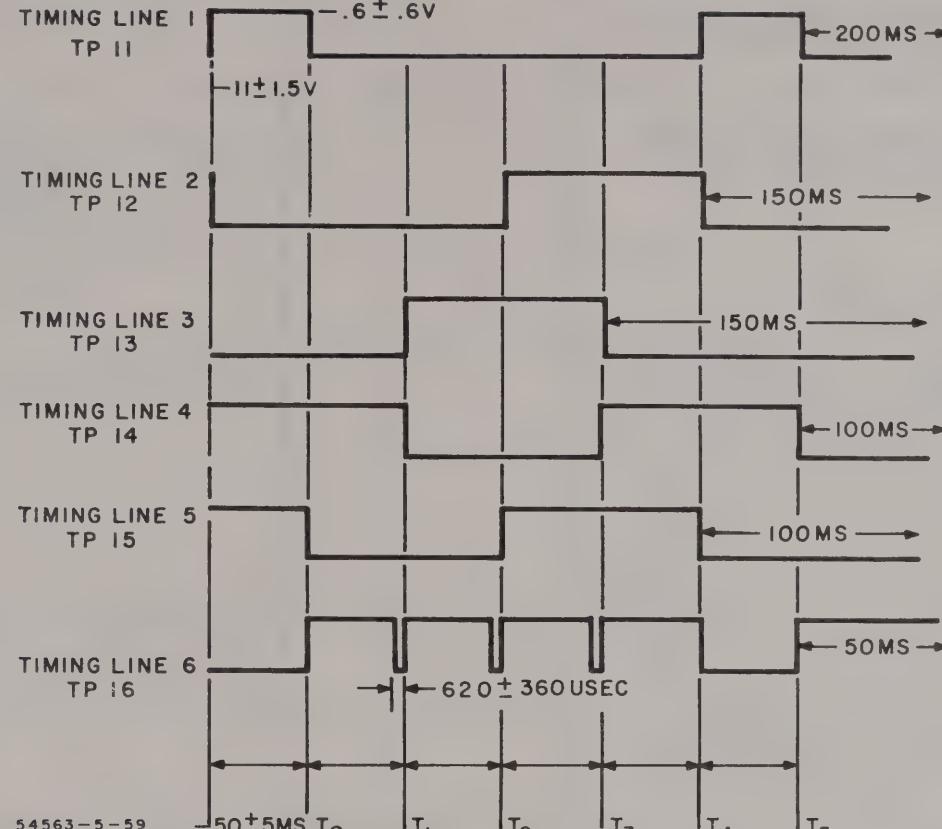
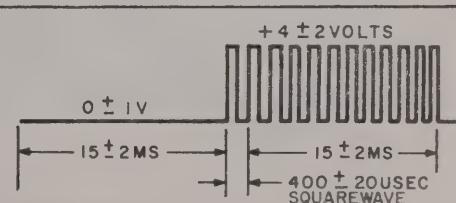
STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
			
25	Disconnect oscilloscope.		
26	On Indicator Test Electrical Assembly, set RADIO 1 thru RADIO 4 MODE SELECT switches to TEST.		On Indicator Test Electrical Assembly, RADIO 1 thru RADIO 4 TEST and DATA indicators light.
27	On Test Set Coupler, turn XMIT SET switch to position 1.		INDICATOR TEST PANEL 2 indicator lights.
28	Connect oscilloscope across XMIT 1 test jacks.		
29	On Indicator Test Electrical Assembly, set MSG ON/OFF switch to ON and monitor oscilloscope waveform.	XMIT 1 test jacks	
30	On Indicator Test Electrical Assembly, set RATE switch to 10 KC.		Same as step 29 except period of square wave pulse is 200 ± 20 msec

TABLE 3-9. (Continued)

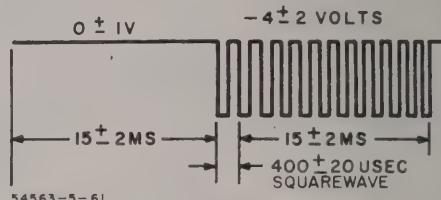
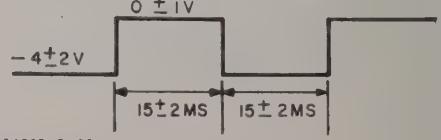
STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
31	On Indicator Test Electrical Assembly, set RATE switch to 5 KC.		
32	On Indicator Test Electrical Assembly, set MSG NORM/INVERT switch to INVERT position.		 <p>54563-5-61</p>
33	On Indicator Test Electrical Assembly, set RATE 5 KC/10 KC switch to 10 KC.		Same as step 32 except period of square wave pulse 200 ± 20 ms
34	On Indicator Test Electrical Assembly, set RATE 5 KC/10 KC switch to 5 KC and MSG NORM/INVERT switch to NORM.		
35	Sequentially set RISE TIME SEL USEC switch to positions 10, 20, 30, and 40.		Rise time of square wave pulse, step 29, changes according to switch setting ± 5 kc/s.
36	On Indicator Test Electrical Assembly turn RISE TIME SEL USEC switch to OFF.		
37	Sequentially set XMIT SET switch to positions 2, 3, and 4.		INDICATOR TEST PANEL/2 remains lighted in each position and output waveform, step 29, is observed on oscilloscope.
38	Reset XMIT SET switch to position 1.		
39	Connect oscilloscope to XMIT 2 terminals on Test Set Coupler.	XMIT 2 test jacks	Same as step 32
40	Repeat step 37.		Same as step 37
41	Reset XMIT SET switch to position 1.		
42	Connect oscilloscope across KEY 1 terminals on Test Set Coupler.	KEY 1 test jacks	 <p>54563-5-62</p>
43	Repeat step 37.		Same as step 37 except waveform of step 42 displayed for each position.

TABLE 3-9. (Continued)

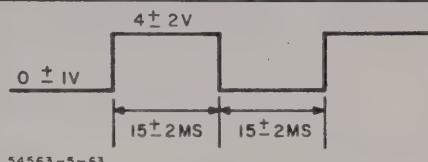
STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
44	Reset XMIT SET switch to position 1.		 54563-5-63
45	Connect oscilloscope across KEY 2 terminals on Test Set Coupler.		
46	Repeat step 37.		Same as step 37 except waveform of step 44 displayed for each position
47	Reset XMIT SET switch to position 1.		INDICATOR TEST PANEL/2 goes off.
48	Disconnect oscilloscope from Test Set Coupler.		
49	On Test Set Coupler turn RECEIVE TEST switch to position 1.		
50	On Indicator Test Electrical Assembly, press RESET push-button switch.		On Indicator Test Electrical Assembly, VALID indicator lights and ERROR indicator goes off.
51	Repeat step 50 with RECEIVE TEST switch set sequentially to positions 2, 3, and 4.		
52	Turn RECEIVE TEST switch to OFF position.		
53	On Indicator Test Electrical Assembly turn RADIO 1 thru RADIO 4 MODE SELECT switches to DATA.		
54	On Indicator Test Electrical Assembly set MSG ON/OFF switch to OFF.		
55	Set AC POWER ON/OFF and DC POWER ON/OFF circuit breaker to OFF positions.		AC POWER indicator and DC POWER indicator go off.
56	Disconnect all test equipment and test cables.		

TABLE 3-10. OPERATING INSTRUCTIONS FOR TEST SET COUPLER,
MX-8154/TYA-11 WHEN TESTING DC POWER SUPPLY, ECI 01-00509-001

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION																				
1	Set AC POWER ON/OFF circuit breaker on Test Set Coupler to ON.		AC POWER indicator lights.																				
2	On DC Power Supply, set ON/OFF and CCCG POWER ON circuit breakers to ON.		POWER ON indicator lights.																				
3	Turn TEST SELECT switch to position 3.																						
4	Sequentially turn SELECTOR switch to positions 2 thru 10 while observing indications on electronic multimeter.	OUTPUT test jacks	<table> <thead> <tr> <th>Position</th> <th>Reading</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>+26.5 ± 4 vdc</td> </tr> <tr> <td>3</td> <td>+26.5 ± 4 vdc</td> </tr> <tr> <td>4</td> <td>+12 ± 0.4 vdc</td> </tr> <tr> <td>5</td> <td>+12 ± 0.4 vdc</td> </tr> <tr> <td>6</td> <td>+5.1 ± 0.5 vdc</td> </tr> <tr> <td>7</td> <td>+1.6 ± 0.16 vdc</td> </tr> <tr> <td>8</td> <td>+1.6 ± 0.16 vdc</td> </tr> <tr> <td>9</td> <td>+1.6 ± 0.16 vdc</td> </tr> <tr> <td>*10</td> <td>-12 ± 1.2 vdc</td> </tr> </tbody> </table>	Position	Reading	2	+26.5 ± 4 vdc	3	+26.5 ± 4 vdc	4	+12 ± 0.4 vdc	5	+12 ± 0.4 vdc	6	+5.1 ± 0.5 vdc	7	+1.6 ± 0.16 vdc	8	+1.6 ± 0.16 vdc	9	+1.6 ± 0.16 vdc	*10	-12 ± 1.2 vdc
Position	Reading																						
2	+26.5 ± 4 vdc																						
3	+26.5 ± 4 vdc																						
4	+12 ± 0.4 vdc																						
5	+12 ± 0.4 vdc																						
6	+5.1 ± 0.5 vdc																						
7	+1.6 ± 0.16 vdc																						
8	+1.6 ± 0.16 vdc																						
9	+1.6 ± 0.16 vdc																						
*10	-12 ± 1.2 vdc																						
5	Turn SELECTOR switch to position 1.																						
6	Set electronic voltmeter SELECTOR switch to AC.																						
7	Turn TEST SELECT switch to position 4.																						
8	Sequentially turn SELECTOR switch to positions 2 thru 5 while observing indications on electronic multimeter.		<table> <thead> <tr> <th>Position</th> <th>Reading</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>24 ± 2.5 vac</td> </tr> <tr> <td>3</td> <td>24 ± 2.5 vac</td> </tr> <tr> <td>4</td> <td>14 ± 1.5 vac</td> </tr> <tr> <td>5</td> <td>14 ± 1.5 vac</td> </tr> </tbody> </table>	Position	Reading	2	24 ± 2.5 vac	3	24 ± 2.5 vac	4	14 ± 1.5 vac	5	14 ± 1.5 vac										
Position	Reading																						
2	24 ± 2.5 vac																						
3	24 ± 2.5 vac																						
4	14 ± 1.5 vac																						
5	14 ± 1.5 vac																						
9	Turn TEST SELECT and SELECTOR switches to position 1.																						
10	Turn AC POWER ON/OFF circuit breaker to OFF.		AC POWER indicator goes off.																				
11	On DC Power Supply, set CCCG POWER and ON/OFF circuit breakers to OFF (down).		POWER ON indicator goes off.																				
12	Disconnect all test equipment and test cables.																						

*Set SELECTOR switch on electronic voltmeter to (-).

(c) Operating Procedures. The operating procedures for using Test Set Coupler to test Audio Amplifier-Converter are provided in Table 3-11. If an abnormal indication is observed refer to the troubleshooting procedures for Five Channel Audio Amplifier-Converter, ECI 01-00730-001, as provided in Section 4 of TM-04165A-35/2-1, Maintenance and Overhaul Manual for Communications Central Group, AN/TYA-11.

Note

ALL CONTROLS AND INDICATORS REFERENCED IN TABLE 3-11 ARE LOCATED ON TEST SET COUPLER, MX-8154/TYA-11, UNLESS OTHERWISE SPECIFIED.

(5) Communications Central Group Control, C-8019/TYA-11, Test Procedure. Operating instructions for using Test Set Coupler, MX-8154/TYA-11, to test Communications Central Group Control, C-8019/TYA-11, are composed of a list of ancillary test equipment, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required for operation of the Test Set Coupler when testing Communications Central Group Control:

1. Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001
2. Branched Special Purpose Electrical Cable Assembly W6, ECI 12-01291-001
3. Electronic Voltmeter, ME-30B
4. Signal Generator, AN/URM-127.

(b) Test Setup. To prepare the Test Set Coupler for testing a Communications Central Group Control, proceed as follows:

1 On Test Set Coupler, turn all front panel rotary switches to the OFF or 1 position, as applicable, and set all circuit breaker switches to the OFF (down) position.

2 Connect Special Purpose Electrical Cable Assembly W8 between the Test Set Coupler POWER connector and the primary ac power source.

3 Connect Branched Special Purpose Electrical Cable Assembly W6 between Test

Set Coupler connector J7 and Communications Central Group Control as follows:

Cable Connector	Communications Central Group Control Connector
P17	J7
P12	J1
P11	J6

4 Connect a test lead between GRD (ground) lug on the Test Set Coupler and earth ground.

(c) Operating Procedures. The operating procedures for using Test Set Coupler to test Communications Central Group Control, are provided in Table 3-12. If an abnormal indication is observed refer to the troubleshooting procedures for Communications Central Group Control, C-8019/TYA-11, as provided in TM-04165A-35/2-1, Maintenance and Overhaul Manual or Communications Central Group, AN/TYA-11.

Note

ALL CONTROLS AND INDICATORS REFERENCED IN TABLE 3-12 ARE LOCATED ON TEST SET COUPLER, MX-8154/TYA-11, UNLESS OTHERWISE SPECIFIED.

e. COMMUNICATIONS TEST KIT, MK-1102/TYA-11, OPERATING PROCEDURES. The following paragraphs provide instructions for the use of individual test items Communications Test Kit, MK-1102/TYA-11, in testing equipment of Communications Central Group, AN/TYA-11. Detailed operating procedures are provided for five major items of Communications Test Kit, MK-1102/TYA-11, as identified below:

1. Test Adapter, MX-8150/TYA-11
2. Test Adapter, MX-8151/TYA-11
3. Test Adapter, MX-8152/TYA-11
4. Test Set Coupler, MX-8153/TYA-11
5. Fixed Mounting Rotating Counter, ECI 03-01937-001.

Radio Set Control, C-3811/AR, is used in testing Antenna Coupler, CU-1406/GRC and Synthesizer- Receivers, ECI 01-00510-001, -002, or -003 on Test Adapter, MX-8152/TYA-11 and Test Set Coupler, MX-8153/TYA-11, respectively.

TABLE 3-11. OPERATING INSTRUCTIONS FOR TEST SET COUPLER, MX-8154/TYA-11
WHEN TESTING FIVE CHANNEL AUDIO AMPLIFIER-CONVERTER, ECI 01-00730-001

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	Set AC POWER ON/OFF circuit breaker to ON.		AC POWER indicator lights.
2	Set DC POWER ON/OFF circuit breaker to ON.		DC POWER indicator lights.
3	Turn TEST SELECT switch to position 5.		
4	Turn SELECTOR switch to position 10 and record digital voltmeter indication.	OUTPUT test jacks	28 \pm 1 vdc
5	Press and hold LOADING switch.		a. XMTR KEYING indicator lights. b. Voltmeter reading should be within \pm 0.5 vdc of reading recorded in step 4.
6	Release LOADING switch.		XMTR KEYING indicator goes off.
7	Disconnect digital voltmeter from OUTPUT terminals.		
8	Turn SELECTOR switch to position 1.		
9	Connect signal generator, and electronic voltmeter across INPUT terminals.		
10	Connect second electronic voltmeter across OUTPUT terminals.		
11	Set SELECTOR switch to position 2.		
12	Sequentially adjust signal generator for parameters identified below while observing test results on electronic voltmeter no. 2: a. Frequency: 3 kc/s Amplitude: 0.78 vrms b. Frequency: 300 cps Amplitude: 10.0 vrms	OUTPUT test jacks OUTPUT test jacks	a. 0.5 to 1.0 vrms b. 0.5 to 1.0 vrms
13	Sequentially set CHANNEL switch to positions 2 thru 5 and repeat step 12.		Same as step 12 for each setting of CHANNEL switch

TABLE 3-11. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
14	Turn CHANNEL switch to position 1 and SELECTOR switch to position 3.		XMTR KEYING indicator lights.
15	Adjust signal generator for the following output parameters while observing test results on electronic voltmeter no. 2: a. Frequency: 3 kc/s Amplitude: 0.78 vrms b. Frequency: 300 cps Amplitude: 0.78 vrms	OUTPUT test jacks OUTPUT test jacks	a. 0.5 to 1.0 vrms b. 0.5 to 1.0 vrms
16	Sequentially set CHANNEL switch to positions 2 thru 5 while observing test results on electronic voltmeter no. 2.	OUTPUT test jacks	0.5 to 1.0 vrms for each position
17	Turn CHANNEL switch to position 1 and SELECTOR switch to position 4.		XMTR keying indicator remains lighted.
18	Adjust signal generator for output frequency of 1.0 kc/s, at amplitude of 0.78 vrms and observe test results on electronic voltmeter no. 2.	OUTPUT test jacks	0.1 to 0.35 vrms
19	Sequentially set CHANNEL switch to positions 2 thru 5 while observing test results on electronic voltmeter no. 2.	OUTPUT test jacks	0.1 to 0.35 vrms for each position
20	Turn CHANNEL switch to position 1 and SELECTOR switch to position 5.		XMTR KEYING indicator remains lighted.
21	Adjust signal generator for the following parameters while observing test results on electronic voltmeter no. 2: a. Frequency: 3 kc/s Amplitude: 1.5 vrms b. Frequency: 300 cps Amplitude: 7.0 vrms	OUTPUT test jacks OUTPUT test jacks	a. 0.5 to 1.0 vrms b. 0.5 to 1.0 vrms
22	Turn CHANNEL switch and SELECTOR switch to 1 position.		XMTR KEYING indicator goes off.
23	Set AC POWER ON/OFF and DC POWER ON/OFF switch to OFF positions.		AC POWER and DC POWER indicators go off.
24	Disconnect all test equipment and test cables.		

TABLE 3-12. OPERATING INSTRUCTIONS FOR TEST SET COUPLER,
MX-8154/TYA-11, WHEN TESTING COMMUNICATIONS CENTRAL CONTROL GROUP, C-8019/TYA-11

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	Set AC POWER ON/OFF circuit breaker switch to ON.		AC POWER indicator lights.
2	On Communications Central Group Control set primary power ON/OFF switch to ON.		POWER ON indicator on Communications Central Group Control lights.
3	Set DC POWER ON/OFF switch to ON.		DC POWER indicator lights.
4	On the Communications Central Group Control set RADIO 1 thru RADIO 5 OPERATOR SELECT switches to position 1.		a. On Communications Central Group Control RADIO 1 thru RADIO 5 IN USE indicators light. b. On Test Set Coupler IN USE and KEYING indicators light.
5	Sequentially set AUDIO switch to positions 2 thru 5.		Same as step 4
6	Reset AUDIO switch to position 1.		
7	On Communications Central Group Control reset RADIO 2 thru RADIO 5 OPERATOR SELECT switch to OFF.		
8	On Communications Central Group Control sequentially set RADIO 1 OPERATOR SELECT switch to positions 2 thru 5.		RADIO 1 IN USE indicator on Communications Central Group Control and KEYING indicator on Test Set Coupler remain lighted in each position.
9	On Communications Central Group Control set RADIO 1 OPERATOR SELECT switch to LOCAL position.		Test Set Coupler KEYING indicator goes off.
10	On Communications Central Group Control set RADIO 1 OPERATOR SELECT switch to OFF.		RADIO 1 IN USE indicator on Communications Central Group Control and Test Set Coupler IN USE indicator go off.
11	Repeat steps 8 thru 10 using RADIO 2 OPERATOR SELECT switch on Communications Central Group Control.		Same as steps 8 thru 10 except using RADIO 2 IN USE indicator on Communications Central Group Control.
12	Repeat steps 8 thru 10 using RADIO 3 OPERATOR SELECT switch on Communications Central Group Control.		Same as steps 8 thru 10 except using RADIO 3 IN USE indicator on Communications Central Group Control.

TABLE 3-12. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION																						
13	Repeat steps 8 thru 10 using RADIO 4 OPERATOR SELECT switch on Communications Central Group Control.		Same as steps 8 thru 10 except using RADIO 4 IN USE indicator on Communications Central Group Control.																						
14	Repeat steps 8 thru 10 using RADIO 5 OPERATOR SELECT switch on Communications Central Group Control.		Same as steps 8 thru 10 except using RADIO 5 IN USE indicator on Communications Central Group Control.																						
15	Reset AUDIO switch to position 1.																								
16	On the Communications Central Group Control momentarily press RADIO 1 CHANNEL ACTIVATE switch.		On Communications Central Group Control RADIO 1 CHANNEL indicator displays a 1. On Test Set Coupler CODE 4 indicator lights momentarily.																						
17	Sequentially set CHANNEL SELECT switch on Communications Central Group Control to positions 2 thru 0 and repeat step 16 for each position.		<p>On Communications Central Group Control RADIO 1 CHANNEL indicator displays number of channel selected. On Test Set Coupler monitor CODE indicators 1 thru 4 for following indications:</p> <table> <thead> <tr> <th>CHANNEL SELECT Position</th> <th>CODE Indicators</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4</td> </tr> <tr> <td>2</td> <td>1</td> </tr> <tr> <td>3</td> <td>2</td> </tr> <tr> <td>4</td> <td>3</td> </tr> <tr> <td>5</td> <td>1, 4</td> </tr> <tr> <td>6</td> <td>1, 2</td> </tr> <tr> <td>7</td> <td>2, 3</td> </tr> <tr> <td>8</td> <td>1, 3, 4</td> </tr> <tr> <td>9</td> <td>1, 2, 4</td> </tr> <tr> <td>0</td> <td>1, 2, 3</td> </tr> </tbody> </table>	CHANNEL SELECT Position	CODE Indicators	1	4	2	1	3	2	4	3	5	1, 4	6	1, 2	7	2, 3	8	1, 3, 4	9	1, 2, 4	0	1, 2, 3
CHANNEL SELECT Position	CODE Indicators																								
1	4																								
2	1																								
3	2																								
4	3																								
5	1, 4																								
6	1, 2																								
7	2, 3																								
8	1, 3, 4																								
9	1, 2, 4																								
0	1, 2, 3																								
18	On Communications Central Group Control reset CHANNEL SELECT switch to position 1.																								
19	On Test Set Coupler turn RADIO switch to position 2, and repeat steps 16, 17, and 18 using RADIO 2 CHANNEL ACTIVATE switch on Communications Central Group Control.		Same as steps 16 and 17 except Communications Central Group Control indications on RADIO 2 CHANNEL indicator																						

TABLE 3-12. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
20	On Test Set Coupler, turn RADIO switch to position 3 and repeat steps 16, 17, and 18 using RADIO 3 CHANNEL ACTIVATE switch on Communications Central Group Control.		Same as steps 16 and 17 except Communications Central Group Control indications on RADIO 3 CHANNEL indicator
21	On Test Set Coupler turn RADIO switch to position 4 and repeat steps 16, 17, and 18 using RADIO 4 CHANNEL ACTIVATE switch on Communications Central Group Control.		Same as steps 16 and 17 except Communications Central Group Control indications on RADIO 4 CHANNEL indicator
22	Set IC/RADIO switch to IC position.		On Communications Central Group Control INTERCOM indicator lights.
23	Connect electronic voltmeter across Test Set Coupler OUTPUT terminals.		
24	On Communications Central Group Control press PUSH-TO-RING switch.	OUTPUT test jacks	Electronic voltmeter reads 1.0 ± 0.5 vac at 400 cps.
25	Connect signal generator across Test Set Coupler INPUT terminals.		
26	Adjust for output of 1 kc/s at 700 mv.		
27	Set PTT ON/OFF switch to ON.	OUTPUT test jacks	Test Set Coupler MIKE indicator lights and electronic voltmeter indicates 250 ± 100 mv.
28	Set PTT ON/OFF switch to OFF.		Test Set Coupler MIKE indicator goes off.
29	Disconnect plug P12 of Special Purpose Electrical Cable Assembly W6 from connector J1 on Communications Central Group Control. Sequentially connect plug P11 to connectors J2 thru J5 on Communications Central Group Control and, with INTERCOM SELECT switch set to position of connector being used (2 thru 5), repeat steps 25 thru 28.		Same as steps 25 thru 28

TABLE 3-12. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
30	On Communications Central Group Control reset INTERCOM SELECT switch to 1.		
31	Disconnect plug P11 of Branched Special Purpose Electrical Cable Assembly W6 from Communications Central Group Control connector J6 and connect P11 to connector J1. Disconnect plug P12 of cable W6 from connector J5 and connect P12 to connector J6.		
32	Set PTT ON/OFF switch to ON.		Test Set Coupler MIKE indicator comes on.
33	On Communications Central Group Control set LOCAL OPERATE switch to TALK.	OUTPUT test jacks	Electronic voltmeter indicates 250 ± 100 mv.
34	Set PTT ON/OFF switch to OFF.		Test Set Coupler MIKE lamp goes off.
35	Disconnect plug P11 of Branched Special Purpose Electrical Cable Assembly W6 from connector J1 on Communications Central Group Control and repeat steps 32 thru 34 with P11 connected sequentially to connectors J2 thru J7.		Same as steps 32 thru 34
36	Disconnect plug P11 of Branched Special Purpose Electrical Cable Assembly W6 from connector J5 of Communications Central Group Control and connect plug P11 to connector J1.		
37	Disconnect plug P12 of cable W6 from connector J6 on Communications Central Group Control.		
38	On Communications Central Group Control set LOCAL OPERATE switch to OFF.		
39	Verify signal generator is providing output of 1 kc/s at 700 mv.		
40	Set RADIO/IC switch to RADIO position.		On Communications Central Group Control INTERCOM indicator goes off.

TABLE 3-12. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
41	Set PTT ON/OFF switch to ON.		Test Set Coupler MIKE indicator lights.
42	On Communications Central Group Control set RADIO 1 thru RADIO 5 OPERATOR SELECT switches to position 1.	OUTPUT test jacks	On Communications Central Group Control RADIO 1 thru RADIO 5 IN USE indicators light. On Test Set Coupler KEYING indicator lights. Electronic voltmeter reads 500 ±100 mv.
43	Sequentially set AUDIO switch to positions 2 thru 5.		Same as step 42
44	Disconnect plug P11 of Branched Special Purpose Electrical Cable Assembly W6 from Test Set Coupler connector J1. Repeat steps 42 and 43 with plug P11 connected sequentially to connectors J2 thru J5 and OPERATOR SELECT switches set to positions 2 thru 5 and LOCAL, respectively.		Same as steps 42 and 43
45	On Communications Central Group Control reset RADIO 1 thru RADIO 5 OPERATOR SELECT switches to OFF.		RADIO 1 thru RADIO 5 IN USE indicators on Communications Central Group Control to off. On Test Set Coupler IN USE and KEYING indicators go off.
46	Set PTT ON/OFF switch to OFF.		MIKE indicator goes off.
47	Disconnect audio oscillator and electronic voltmeter.		
48	Set DC POWER ON/OFF circuit breaker to OFF.		DC POWER indicator goes off.
49	On Communications Central Group Control set POWER ON/OFF switch to OFF.		POWER ON indicator on Communications Central Group Control goes off.
50	Set AC POWER ON/OFF circuit breaker to OFF.		AC POWER indicator goes off.
51	Disconnect test cables from Communications Central Group Control and from Test Set Coupler.		

Therefore, operating instructions for the Radio Set Control are provided in the procedural instructions for Test Adapter, MX-8152/TYA-11, Test Set Coupler, MX-8153/TYA-11. The cable assemblies and accessory items contained in Communications Test Kit, MK-1102/TYA-11 support the operation of five major test items in Communications Test Kit, MK-1102/TYA-11. There are no detailed operating procedures for the cables and accessories and instructions for their use are therefore limited to interconnection within the test setup for the specific procedure being performed.

(1) Test Adapter, MX-8150/TYA-11, Test Procedures. The operating instructions for using Test Adapter, MX-8150/TYA-11, to check the minimum performance standards of a Radio Set, AN/GRC-112, are composed of a list of ancillary test equipment and accessories, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required when using the Test Adapter to check the minimum performance standards of a Radio Set:

1. Electrical Power Cable Assembly W1, CX-10932/TYA-11, (part of Communications Test Kit, MK-1102/TYA-11)

2. Special Purpose Electrical Cable Assembly W4, CX-10917/TYA-11, (part of Communications Test Kit, MK-1102/TYA-11)

3. Coaxial Crystal Mixer, CV-2513/U, (part of Communications Test Kit, MK-1102/TYA-11)

4. Connector Adapters, UG-1840/U, (2) and UG-1841/U, (part of Communications Test Kit, MK-1102/TYA-11)

5. Fixed Attenuator, CN-1248/U, (part of Communications Test Kit, MK-1102/TYA-11)

6. Termaline Wattmeter, Bird 6835

7. Digital Voltmeter, HP-3440A

8. Electronic Multimeter, AN/USM-116

9. Battery (6 volt), Burgess Type

718 (4) 10. Potentiometer, 1K, 2W (2)

11. Electronic Voltmeter, ME-30B

(2)

ORIGINAL

102 FSK

12. Signal Generator, AN/USM-44
13. Fuse, MK-1730/U
14. FM Signal Generator, Waltham
15. Frequency Counter, HP-5245L
16. Oscilloscope, Fairchild 765MH
17. Plug-In Unit, Fairchild 76-02A
18. Plug-In Unit, Fairchild 74-11A
19. Distortion Analyzer, HP-330B
20. Signal Generator, AN/URM-127
- (2)
21. Multimeter, AN/PSM-4
22. Interconnection cable assemblies and connector adapters as required (part of Communications Test Kit, MK-1102/TYA-11)
23. Special Purpose Cable Assembly W51 (part of Accessory Kit, MK-853/GRC)
24. RF Signal Sampler Coupling, Microlab HZ-10H, (part of Accessory Kit, MK-853/GRC).

(b) Test Setup. To prepare for a check of the Radio Set minimum performance standards using the Test Adapter, proceed as follows:

1 Connect the Test Adapter and ancillary test equipment, cables, and accessories to the Radio Set, to be tested as shown in Figure 3-8.

Note

FIGURE 3-8 ILLUSTRATES THE PRELIMINARY TEST SETUP REQUIREMENTS. ADDITIONAL TEST SETUP DIAGRAMS ARE PROVIDED WHERE REQUIRED IN THE OPERATING PROCEDURES.

2 Position Radio Set front panel controls as indicated below:

a Power Supply, PP-4351/GRC-112

<u>Control</u>	<u>Position</u>
----------------	-----------------

ON/PRIM. PWR EMER OFF switch	PRIM. PWR EMER OFF
HV ON/STBY switch	STBY

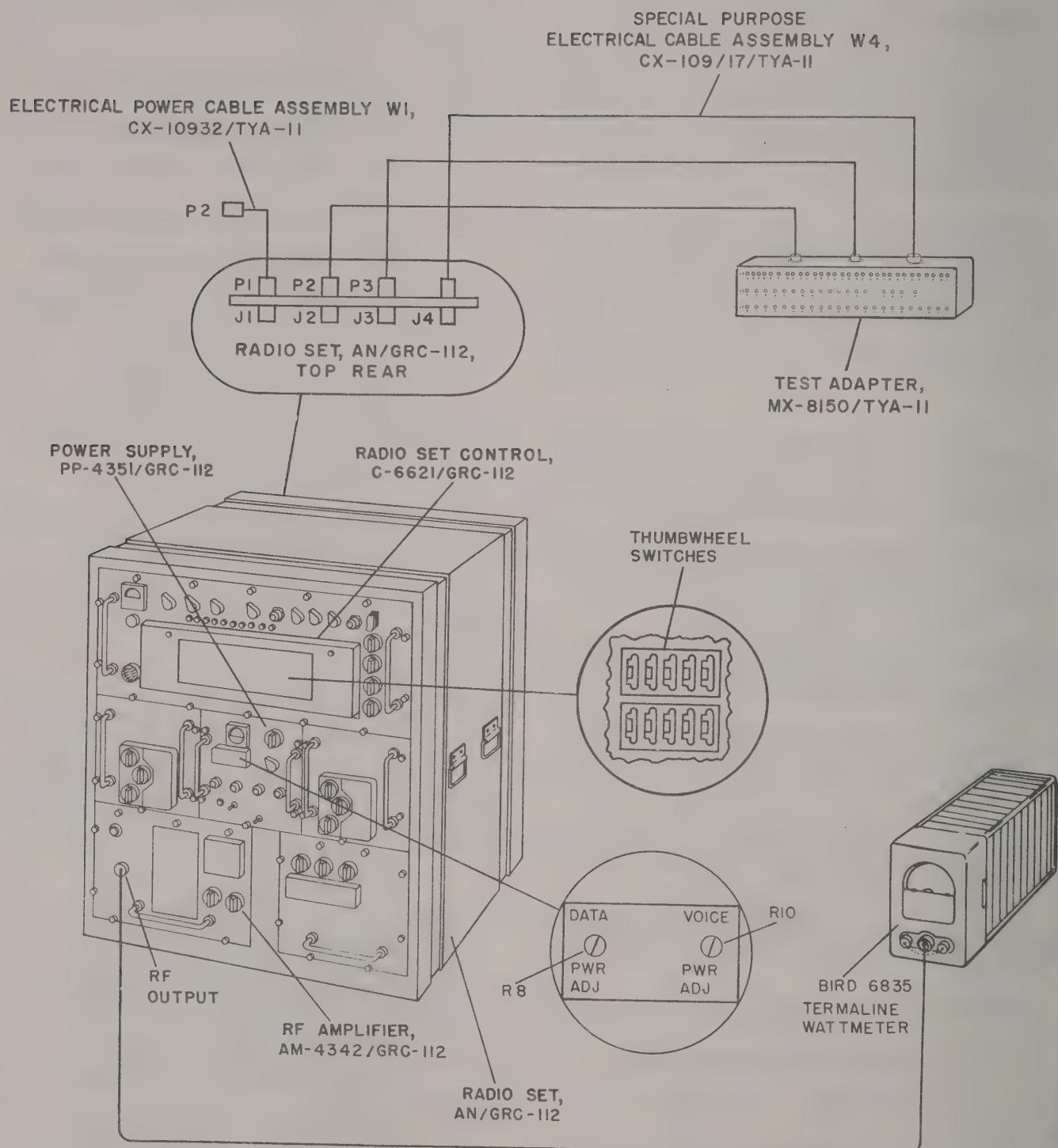


Figure 3-8. Radio Set, AN/GRC-112,
Minimum Performance Standards Check, Preliminary Test Setup No. 1

112 b Radio Set Control, C-6621/GRC-

<u>Control</u>	<u>Position</u>
CHANNELING MODE switch	MAN.
MODULATION MODE switch	VOICE
OPERATIONAL MODE switch	SINGLE FREQ
ANTENNA switch	SEP
BATTLE SHORT switch	OFF
METER SELECTOR switch	FWD
TEST KEY switch	Off (Center)
KEY CONTROL switch	NORMAL
LOCAL PRESET CHAN switch	10
TRANSMIT FREQUENCY SELECT switches	225.00
RECEIVE FREQUENCY SELECT switches	225.00

002: c Receiver Group, ECI 03-01380-

<u>Control</u>	<u>Position</u>
R1 potentiometer (VO LEVEL MN)	Fully clockwise
R2 potentiometer (VO SQUELCH MN)	Fully counterclockwise

(c) Operating Procedures. Operating instructions for using the Test Adapter, to check the minimum performance standards of a Radio Set are presented in Table 3-13. If an abnormal indication is detected within a specific procedural step of Table 3-13, refer to the corresponding step in Table 4-2-1 of TM-04425A-35/2-1, Maintenance and Overhaul Manual for Radio Set, AN/GRC-112, for fault isolation procedures.

(2) Test Adapter, MX-8151/TYA-11, Test Procedures. The operating instructions for using

Test Adapter, MX-8151/TYA-11 to check the minimum performance standards of a Radio Set, AN/GRC-134, are comprised of a list of ancillary test equipment and accessories, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required when using the Test Adapter to check the minimum performance standards of a Radio Set:

1. Electrical Power Cable Assembly W2, CX-10933/TYA-11, (part of Communications Test Kit, MK-1102/TYA-11)
2. Radio Frequency Cable Assembly, W5, W6, CG-690D/U, (part of Communications Test Kit, MK-1102/TYA-11)
3. Termaline Wattmeter, Bird 6835
4. Signal Generator, AN/URM-127
5. Signal Generator, AN/USM-44
6. Electronic Multimeter, AN/USM-116
7. Oscilloscope, Fairchild 765MH
8. Plug-In Unit, Fairchild 76-02A
9. Plug-In Unit, Fairchild 74-11A.

(b) Test Setup. To prepare for a check of the Radio Set, using the Test Adapter, proceed as follows:

1 On Radio Set, position front panel control as indicated below:

<u>Control</u>	<u>Position</u>
PRIMARY PWR/ON EMERGENCY OFF switch	EMERGENCY OFF
HV ON/STBY switch	STBY
KEY CONTROL switch	NORM
METER SEL switch	FWD
BATTLE SHORT switch	OFF
Channel Frequency Select switches	225.00

TABLE 3-13. TEST ADAPTER, MX-8150/TYA-11, OPERATING INSTRUCTIONS

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	On Power Supply, PP-4351/GRC-112, set ON/PRIM, PWR EMER OFF circuit breaker to ON.		<p>a. PRIM. indicator lights.</p> <p>b. Blowers A2B1, A4B1, and A7B1 operate properly (air exhausts thru exhaust openings).</p> <p>c. READY indicator lights after maximum warmup period of 6 minutes. HV ON indicator lights.</p>
2	On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.		
3	On Power Supply, PP-4351/GRC-112, set meter selector switch to positions indicated below while monitoring output indication displayed on front panel status meter:		<p>28v 200v 300v 1300v 2700v 500v</p> <p>23 to 30 vdc 190 to 220 vdc 290 to 330 vdc 1220 to 1440 vdc 2550 to 2800 vdc 470 to 550 vdc</p>
4	On Receiver Group, ECI 03-01380-002, measure dc voltage at test points TP1 (+18 VDC) and TP15 (-18 VDC), located behind front panel access cover, using digital voltmeter, HP-3440/A.	A3A2A1A1TP1 A3A2A1A1TP15	<p>+18 \pm 0.5 vdc -18 \pm 0.5 vdc</p>
5	<p>Check performance of preset channeling circuitry as follows:</p> <p>a. On Radio Set Control, C-6621/GRC-112, turn CHANNELING MODE switch to LOCAL.</p> <p>b. On Radio Set Control, C-6621/GRC-112, turn LOCAL PRESET CHAN switch to 1.</p>		<p>1. SERVO OPR/MALFUNCTION indicator lights while Radio Set, AN/GRC-112, is channeling and extinguishes when channeling is complete.</p> <p>2. A 2400 cps tone is heard from handset while Radio Set, AN/GRC-112, is channeling and stops when channeling is complete.</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
5 (Cont)	c. On Radio Set Control, C-6621/GRC-112, sequentially turn LOCAL PRESET CHAN switch to positions 2 thru 10.		3. When channeling is complete PRESET CHANNEL 1 indicator lights. Same as step 5b except PRESET CHANNEL indicator light corresponds to position selected on LOCAL PRESET CHAN switch.
6	<p>Check transmitter voice carrier output power as follows:</p> <p>a. On Radio Set, AN/GRC-112, position front panel controls as outlined in paragraph 3-3e(1)(b) 2b and <u>c</u>.</p> <p>b. On Radio Set Control, C-6621/GRC-112, set TEST KEY switch to LOCK.</p> <p>c. On Power Supply, PP-4351/GRC-112, adjust potentiometer A6R10 (located behind front panel access cover) to obtain a reading of 340 watts on front panel meter A1M1.</p> <p>d. Observe power output indication on Termaline Wattmeter.</p> <p>e. Set TEST KEY switch to off (center).</p> <p>f. Repeat steps 6c thru 6e with RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches set to 300.00 mcs and 399.95 mcs.</p>	A1M1	340 watts 350 to 375 watts Same as steps 6b thru 6e
7	<p>Check transmitter fsk power output as follows:</p> <p>a. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to STBY.</p> <p>b. Connect Electronic Multimeter, AN/USM-116, between terminals J2-X and J2-Z of Test Adapter, MX-8150/TYA-11.</p>		HV indicator goes off.

TABLE 3-13. (Continued)

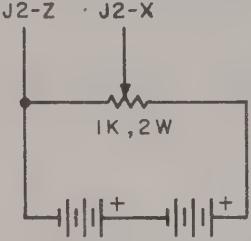
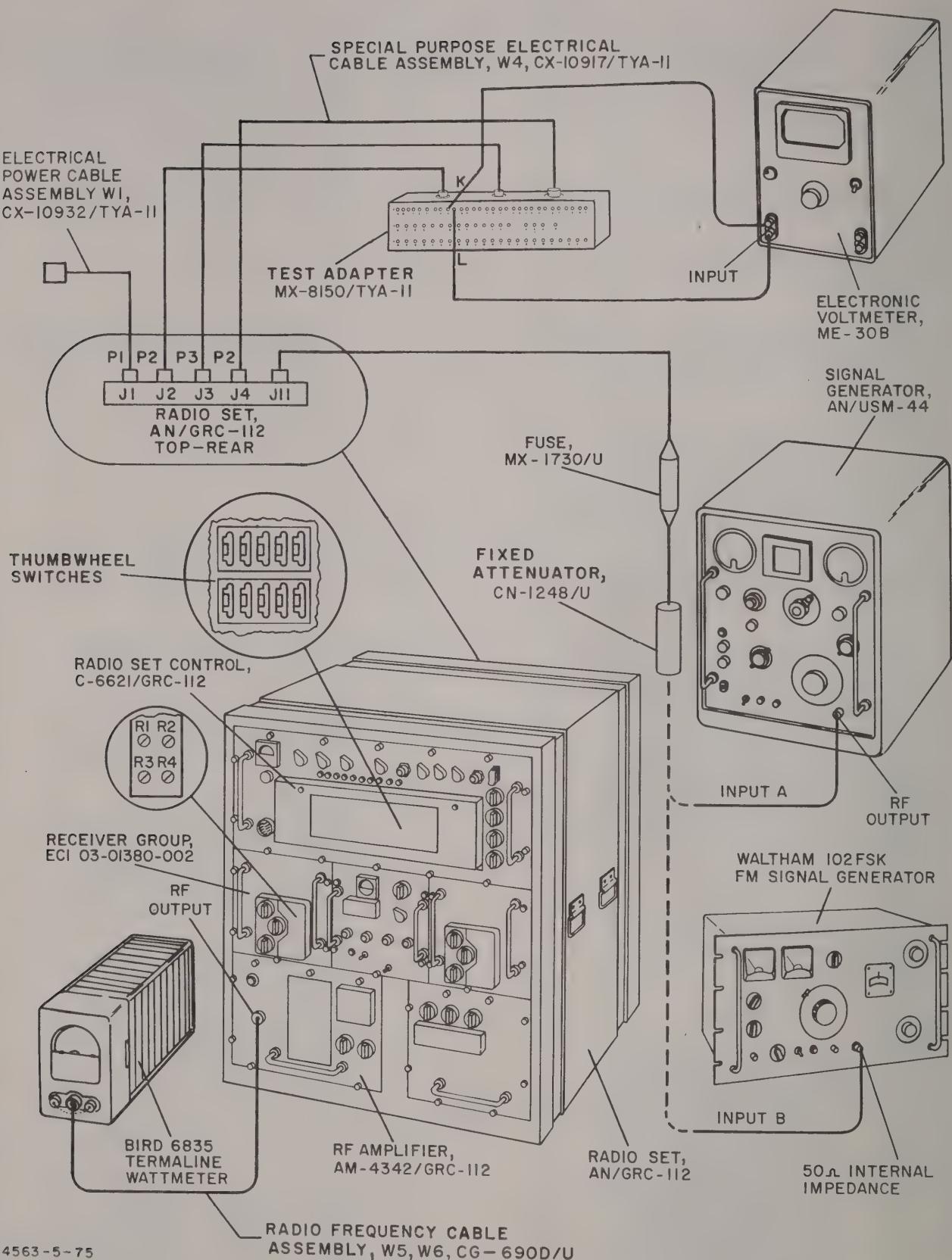
STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
7 (Cont)	<p>c. Connect two 6-vdc batteries and a 1k potentiometer (interconnected as shown below) between test points J2-X and J2-Z of Test Adapter, MX-8150/TYA-11.</p>  <p>54563-5-73</p> <p>d. Adjust potentiometer to obtain reading of +10 vdc on electronic multimeter.</p> <p>e. On Radio Set Control, C-6621/GRC-112, set MODULATION MODE switch to DATA.</p> <p>f. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>g. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 225.00 mcs and turn KEY CONTROL switch to NORMAL.</p> <p>h. Adjust DATA POWER ADJ potentiometer A6R8 (located behind access cover on Power Supply, PP-4351/GRC-112) to obtain a reading of 1150 watts on front panel meter A1M1.</p> <p>i. Observe rf power output reading on Termaline Wattmeter.</p> <p>j. Repeat steps 7g thru 7i with RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches set for 300.00 and 399.95 mcs.</p>	<p>Electronic Multimeter</p> <p>A1M1</p> <p>Termaline Wattmeter</p>	<p>+10 vdc</p> <p>HV indicator lights.</p> <p>1150 watts</p> <p>1000 to 1200 watts</p> <p>Same as steps 7g thru 7i</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
8	<p>Check receiver am. sensitivity as follows:</p> <p>a. Set front panel controls as outlined in paragraph 3-3e(1)(b)2.</p> <p>b. Connect required test equipment as shown in Figure 3-9.</p> <p>c. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>d. Adjust Signal Generator, AN/USM-44, for 225 mcs, 3-microvolt rf output signal modulated 30 percent with 1000 cps.</p> <p>e. When READY indicator lights set HV ON/STBY switch to HV ON.</p> <p>f. On Radio Set Control set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 225.00 mcs.</p> <p>g. Alternately increase and decrease signal generator output signal frequency to determine point at which electronic voltmeter indicates maximum reading. Record.</p> <p>h. Turn off 1000 cps modulation of signal generator and monitor electronic voltmeter reading.</p> <p style="text-align: center;">Note</p> <p>SIGNAL PLUS NOISE-TO-NOISE RATIO IS RATIO BETWEEN ELECTRONIC VOLTMETER INDICATION WITH A MODULATED RF SIGNAL APPLIED TO RECEIVER AND THE ELECTRONIC VOLTMETER INDICATION WITHOUT MODULATED RF SIGNAL APPLIED TO RECEIVER.</p>		<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>HV indicator lights.</p>



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Figure 3-9. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 2

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
8 (Cont)	<p>i. Decrease signal generator output signal level slightly while alternately applying and removing 1000 cps modulation signal until difference in electronic voltmeter db readings are 10 db.</p> <p>j. Monitor output signal level on signal generator.</p> <p>k. Repeat steps 8f thru j with RECEIVE and TRANSMIT FREQUENCY SELECT switches set first to 300.00 mcs and then to 399.95 mcs.</p>		<p>With a signal noise-to-noise ratio of at least 10 db and an audio output signal of at least +3 db (1.1 vrms) signal generator output level is 3 microvolts (97.5 dbm) or less.</p> <p>Note</p> <p>RECEIVER SENSITIVITY IS EQUAL TO LOWEST LEVEL OUTPUT SIGNAL AMPLITUDE OF SIGNAL GENERATOR AT WHICH 10 DB SIGNAL PLUS NOISE-TO-NOISE RATIO CAN BE OBTAINED.</p> <p>Same as steps 8f thru 8j</p>
9	<p>Check receiver fsk sensitivity as follows:</p> <p>a. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to STBY.</p> <p>b. Disconnect signal generator from the Fixed Attenuator, CN-1248/U (Figure 3-9) and connect fm signal generator, Waltham 102 FSK.</p> <p>c. Disconnect electronic voltmeter from test points J2-K and J2-L of Test Adapter, MX-8150/TYA-11, and connect electronic voltmeter between test points J2-a and J2-b on Test Adapter, MX-8150/TYA-11.</p> <p>d. Adjust front panel controls of fm signal generator to obtain 5-microvolt rf output signal of 225 mcs, deviating 20 kc/s at a 1000-cps rate.</p>		HV indicator goes off.

TABLE 3-13. (Continued)

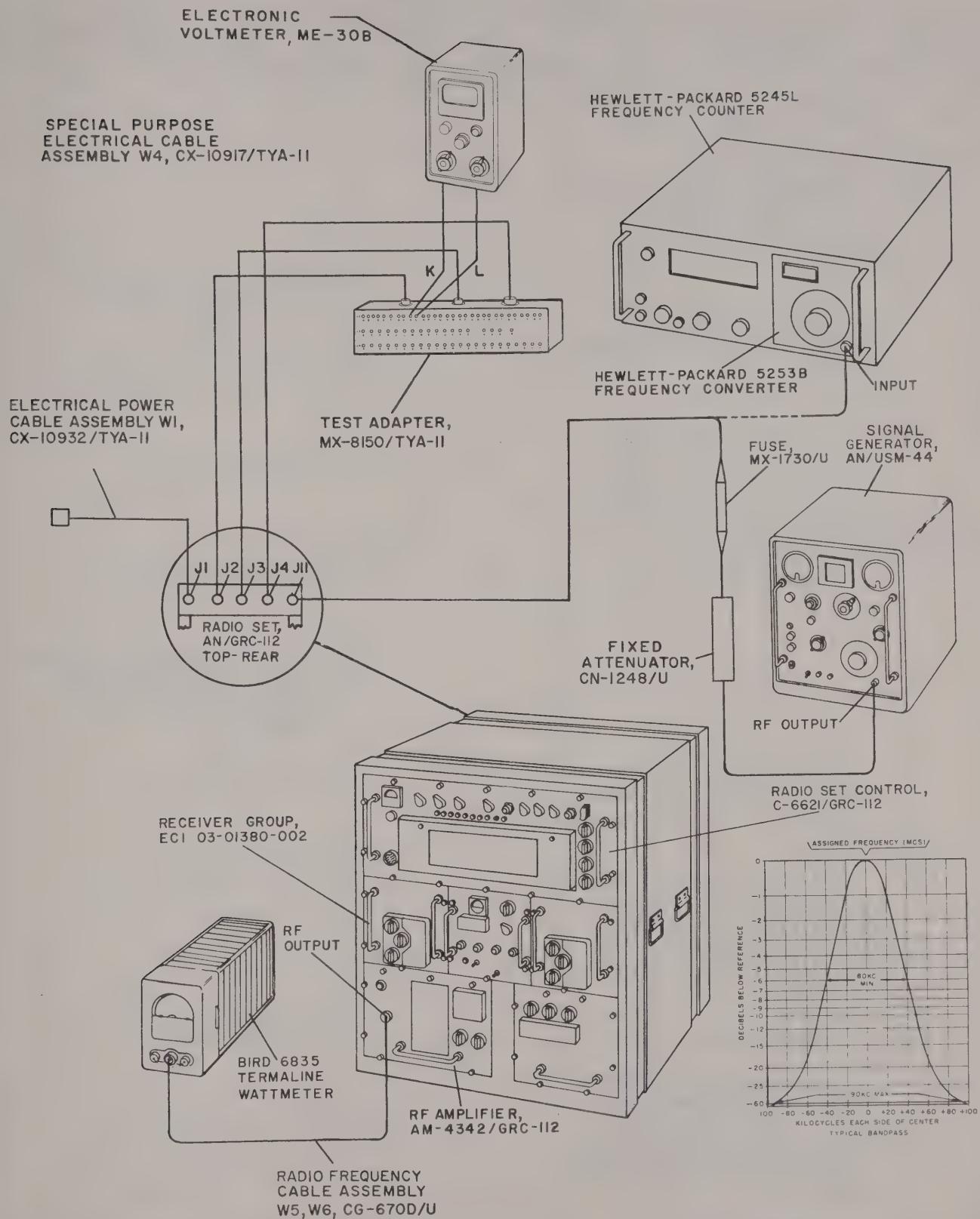
STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
9 (Cont)	<p>e. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>f. On Radio Set Control, C-6621/GRC-112, set MODULATION MODE switch to DATA and set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 225.00 mcs.</p> <p>g. Alternately increase and decrease fm signal generator output signal frequency to determine point at which electronic voltmeter indicates maximum. Leave fm signal generator set at this point.</p> <p>h. Record peak db reading of electronic voltmeter.</p> <p>i. On fm signal generator, turn off 1000 cps deviation signal and again record db reading of electronic voltmeter.</p> <p>j. Decrease output signal level of fm signal generator slightly while alternately applying and removing 1000-cps deviation signal. Repeat this procedure until difference between electronic voltmeter indication with, and the indication without, 1000-cps deviation signal is 20 db.</p> <p>k. Record fm signal generator output signal level and db indication on electronic voltmeter with 1000-cps deviation signal applied.</p> <p>l. Repeat steps 9g thru 9k with RECEIVE and TRANSMIT FREQUENCY SELECT switches set first for 300.00 mcs and then for 399.95 mcs.</p>		<p>HV indicator lights.</p> <p>With a signal plus noise-to-noise ratio of at least 20 db, fm signal generator output signal level is 5 microvolts (-93 dbm) or less.</p> <p>Note</p> <p>RECEIVER SENSITIVITY IS EQUAL TO LOWEST LEVEL SIGNAL OUTPUT FROM FM SIGNAL GENERATOR AT WHICH A 20 DB SIGNAL PLUS NOISE-TO-NOISE RATIO CAN BE OBTAINED.</p> <p>Same as steps 9g thru 9k</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
10	<p>Check receiver vfo frequency accuracy as follows:</p> <p>a. Set Radio Set, AN/GRC-112, front panel controls as outlined in paragraph 3-3e(2)(b)2.</p> <p>b. Connect test equipment and accessories as shown in Figure 3-8.</p> <p>c. Connect AC input of Frequency Counter, HP-5245L (with Frequency Converter Plug-in Unit, HP-5253B) to test point TP2 on Receiver Group, ECI03-01380-002 (located behind front panel access cover).</p> <p>d. On Power Supply, PP-4351/GRC-112, set ON/PRIM. EMER OFF switch to ON.</p> <p>e. After READY indicator lights set HV ON/STBY switch on Power Supply, PP-4351/GRC-112, to HV ON.</p> <p>f. Monitor frequency indication on frequency counter.</p> <p>g. Remove input lead from AC terminal of frequency counter and connect input lead to counter INPUT terminal.</p> <p>h. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT switches to 300.00.</p> <p>i. Monitor frequency indication on frequency counter.</p> <p>j. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT switches to 399.95.</p> <p>k. Monitor frequency indication on frequency counter.</p>		<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>HV indicator lights.</p> <p>46.250 mcs \pm350 cps</p> <p>65.000 mcs \pm350 cps</p> <p>89.9875 mcs \pm350 cps</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
11	<p>Check receiver selectivity as follows:</p> <p>a. Set Radio Set, AN/GRC-112, front panel controls as outlined in paragraph 3-3e(1)(b)2.</p> <p>b. Connect test equipment and accessories as shown in Figure 3-10.</p> <p>c. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>d. Adjust Signal Generator, AN/USM-44, to provide output frequency of 322.55, as indicated on frequency counter with output signal level of -127 dbm.</p> <p style="text-align: center;">Note</p> <p>A SIGNAL AMPLITUDE OF AT LEAST 100 MV IS REQUIRED TO DRIVE FREQUENCY COUNTER, HP 5245L. WHEN MAKING A FREQUENCY MEASUREMENT, FIRST RECORD SETTING OF SIGNAL GENERATOR, AN/USM-44, ATTENUATOR CONTROL. THEN INCREASE SIGNAL GENERATOR OUTPUT SIGNAL LEVEL SUFFICIENTLY TO MAKE MEASUREMENT. THEN RETURN ATTENUATOR CONTROL TO ORIGINAL SETTING.</p> <p>e. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>f. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT switches to 322.55 mcs.</p> <p>g. Observe and record voltage indication on electronic voltmeter.</p>		<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>HV indicator lights.</p>



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Figure 3-10. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 3

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
11 (Cont)	<p>h. Increase setting of signal generator attenuator in clockwise direction of 6 db.</p> <p>i. Decrease signal generator output signal frequency to point at which electronic voltmeter indicates level recorded in step 11g.</p> <p>j. Using frequency counter measure output frequency of signal generator. (Refer to Note in step 11d before making frequency measurement.)</p> <p>k. Increase signal generator output signal frequency above 322.55 mcs to point at which electronic voltmeter indication is same as level recorded in step 11g.</p> <p>l. Repeat step 11j.</p> <p>m. On signal generator turn attenuator control in clockwise direction 60 db from reference setting.</p> <p>n. Increase signal generator output signal frequency above 322.55 mcs to point at which electronic voltmeter indication is same as indication recorded in step 11g.</p> <p>o. Repeat step 11j.</p> <p>p. Decrease signal generator output signal frequency below 322.55 mcs to point at which electronic voltmeter indication is same as indication recorded in step 11g.</p> <p>q. Repeat step 11j.</p>		<p>322.510 mcs or lower</p> <p>322.590 or greater</p> <p>Note</p> <p>THE 6 DB BANDPASS (STEP 1 INDICATION MINUS STEP j INDICATION) IS 80 KC/S MINIMUM.</p> <p>322.645 or more</p> <p>322.455 mcs or less</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
11 (Cont)			<p>Note</p> <p>THE 60 DB BANDPASS (STEP O INDICATION MINUS STEP Q INDICATION) IS 190 KC/S MAXIMUM.</p>
12	<p>Check receiver audio output level as follows:</p> <p>a. Set RADIO SET, AN/GRC-112, front panel controls as outlined in paragraph 3-3e(1) (b)2.</p> <p>b. Correct test equipment and accessories as shown in Figure 3-11.</p> <p>c. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>d. Adjust signal generator to provide a 322.55 mcs, 2000-microvolt output signal modulate 90 percent with 1000 cps.</p> <p>e. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>f. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT switches for 322.55 mcs.</p> <p>g. On signal generator slowly adjust output signal frequency control to obtain a peak indication on electronic voltmeter. (Record indication.)</p> <p>h. Using frequency counter measure signal generator output signal frequency at which peak voltage was obtained on electronic voltmeter. (Record indication.)</p>	<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>HV indicator lights.</p> <p>2.45 vrms (+10 dbm) minimum</p>	

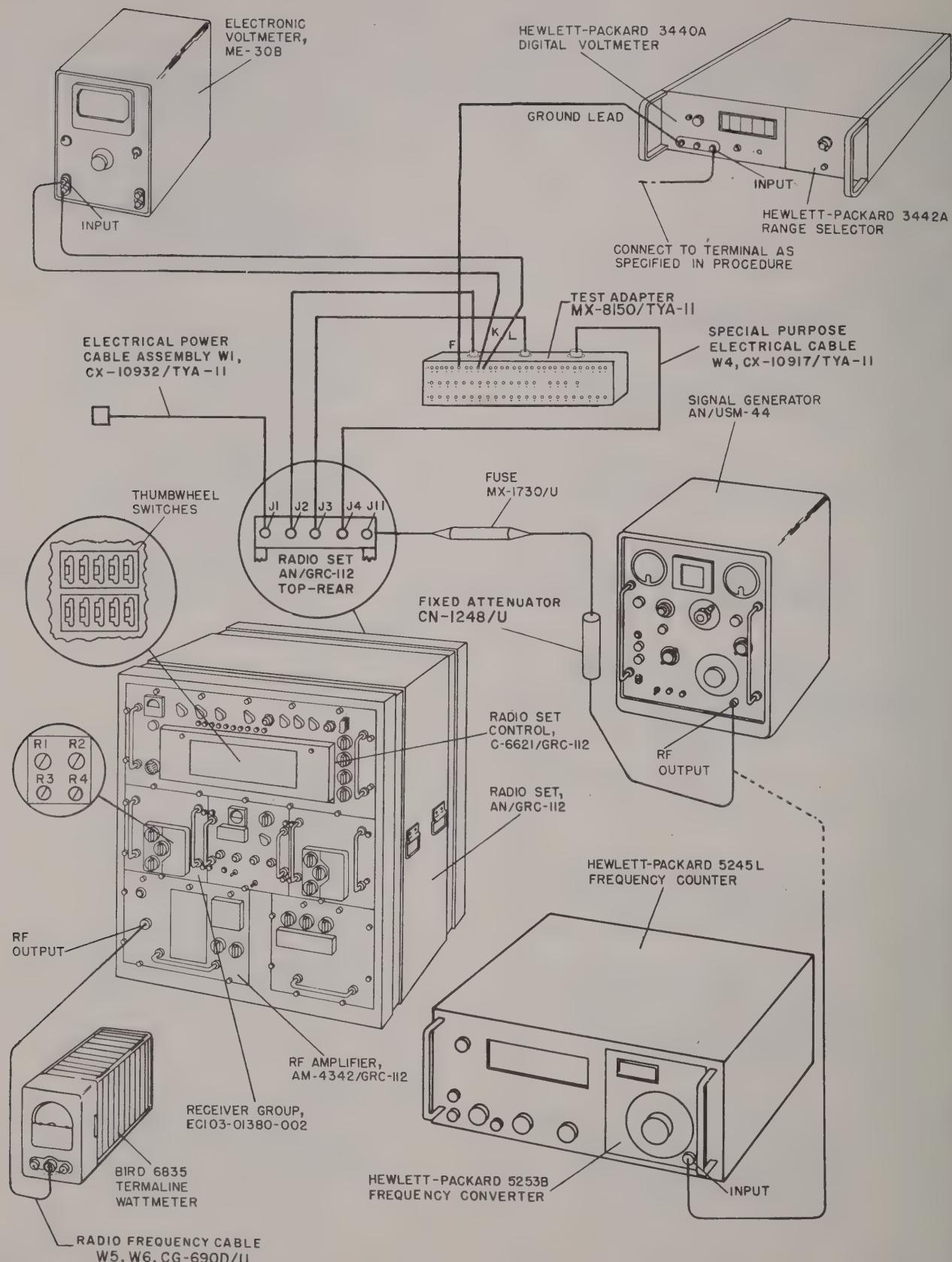


Figure 3-11. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 4

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
12 (Cont)	<p>i. On Receiver Group, ECI 03-01380-002, turn VO LEVEL MN (R1) potentiometer to minimum (fully clockwise).</p> <p>j. Increase signal generator output signal amplitude to 0.5v.</p> <p>k. Observe receiver audio output level indication on electronic voltmeter.</p>		0.245 vrms (-10 dbm) maximum
13	<p>Check receiver fsk data output levels as follows:</p> <p>a. Verify control settings and test equipment connections have not been changed since completion of step 12. (Refer to Figure 3-11.)</p> <p>b. On signal generator turn off 1000 cps modulation signal.</p> <p>c. On Radio Set Control, C-6621/GRC-112, set MODULATION MODE switch to DATA.</p> <p>d. Connect input lead of digital voltmeter to test point J2-a on Test Adapter, MX-8150/TYA-11. Observe and record voltage indication.</p> <p>e. Connect input lead of the digital voltmeter to test point J2-b on Test Adapter, MX-8150/TYA-11. Observe and record voltage indication.</p> <p>f. Using frequency counter to measure output frequency of signal generator, increase signal generator output signal frequency 20 kc/s above frequency recorded in step 12h.</p> <p>g. Connect digital voltmeter to test point J2-b on Test Adapter, MX-8150/TYA-11. Measure and record voltage indication.</p>	<p>J2-a on Test Adapter, MX-8150/TYA-11</p> <p>J2-b on Test Adapter, MX-8150/TYA-11</p> <p>J2-b on Test Adapter, MX-8150/TYA-11</p>	<p>0.0 \pm 3.125 vdc</p> <p>\pm 2.0 vdc of reading observed in step 13d but of reverse polarity</p> <p>5 \pm 0.5 vdc greater than step 13e</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
13	<p>h. Connect digital voltmeter to test point J2-a on Test Adapter, MX-8150/TYA-11. Observe and record voltage indication.</p> <p>i. Using frequency counter to measure frequency of signal generator decrease signal generator output signal frequency 20 kc/s below frequency recorded in step 12h.</p> <p>j. Connect digital voltmeter to test point J2-a on Test Adapter, MX-8150/TYA-11. Observe and record voltage indication.</p> <p>k. Connect digital voltmeter to test point J2-b on Test Adapter, MX-8150/TYA-11. Observe and record voltage indication.</p>	<p>J2-a on Test Adapter, MX-8150/TYA-11</p> <p>J2-a on Test Adapter, MX-8150/TYA-11</p> <p>J2-b on Test Adapter, MX-8150/TYA-11</p>	<p>5 \pm0.5 vdc less than voltage recorded in step 13e.</p> <p>5 \pm0.5 vdc greater than voltage recorded in step 13e</p> <p>5 \pm0.5 vdc less than voltage recorded in step 13e</p>
14	<p>Check receiver remote channeling capability as follows:</p> <p>a. Set Radio Set, AN/GRC-112, front panel controls as outlined in paragraph 3-3e(1)(b)2.</p> <p>b. Connect test equipment and accessories as shown in Figure 3-12.</p> <p>c. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>d. On Oscilloscope, Fairchild 765MH, adjust front panel controls to display audio tone during remote channeling sequences.</p> <p>e. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>f. Connect a jumper lead between test points J2-F and J2-D on Test Adapter, MX-8150/TYA-11.</p>		<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>1. During channeling sequence audio tone, 2400 cps, appears on oscilloscope.</p> <p>2. On Radio Set Control, C-6621/GRC-112, PRESET CHANNEL 1 lights within 60 seconds after jumper lead is connected.</p>

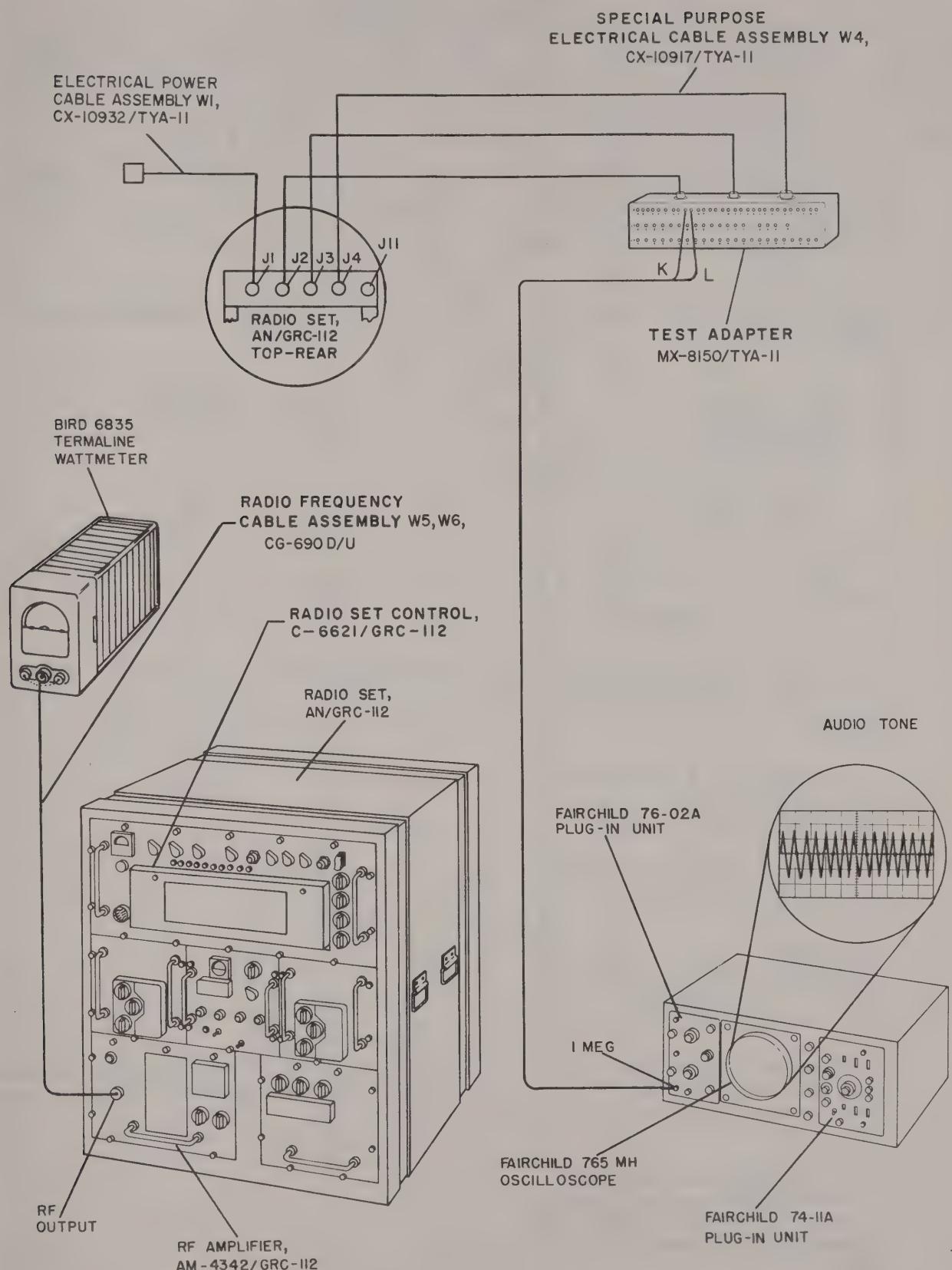
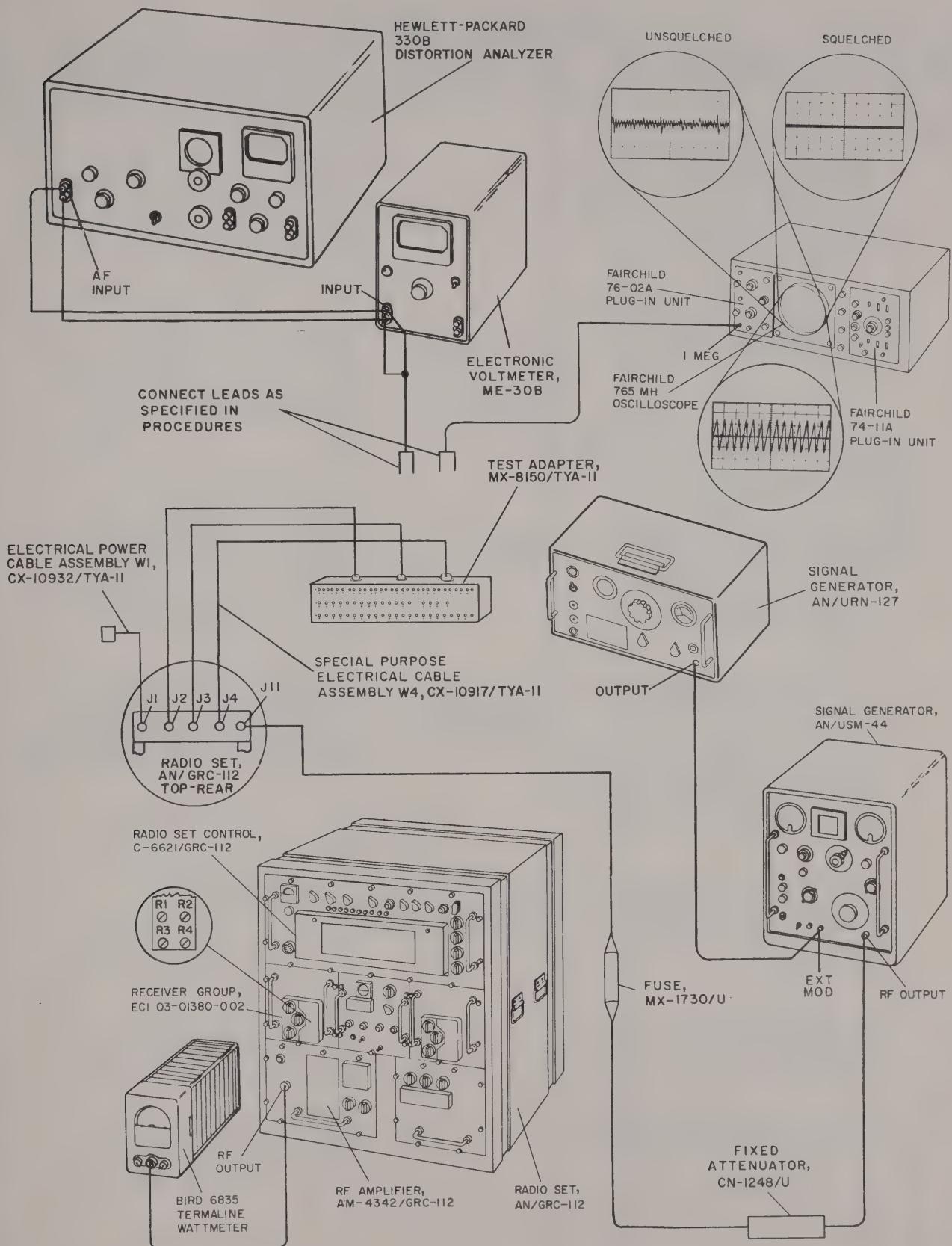


Figure 3-12. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 5

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
14 (Cont)	<p>g. Connect jumper lead as indicated below and verify that channeling action occurs in proper sequence by monitoring audio tone on oscilloscope and PRESET CHANNEL indicators on Radio Set Control, C-6621/GRC-112.</p> <p>h. Test Adapter, MX-8150/TYA-11, Jumper Lead Connections:</p> <p>J2-F to J2-A J2-F to J2-B J2-F to J2-C J2-F to J2-A and J2-D J2-F to J2-A and J2-B J2-F to J2-B and J2-C J2-F to J2-A, J2-C and J2-D J2-F to J2-A, J2-B and J2-D J2-F to J2-A, J2-B and J2-C</p>		<p>PRESET CHANNEL indicator lights:</p> <p>2 3 4 5 6 7 8 9 10</p>
15	<p>Check receiver audio distortion, agc, and squelch functions as follows:</p> <p>a. On Radio Set, AN/GRC-112, set front panel controls as outlined in paragraph 3-3e(1)(b)<u>2</u>.</p> <p>b. Connect test equipment and accessories as shown in Figure 3-13.</p> <p>c. Connect electronic voltmeter across test points J2-K and J2-L on Test Adapter, MX-8150/TYA-11.</p> <p>d. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>e. On Signal Generator, AN/USM-44, adjust front panel controls for a 322.55 mcs, 2000-microvolt output signal externally modulated.</p>		READY indicator lights after maximum warmup period of 6 minutes.



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Figure 3-13. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 6

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
15 (Cont)	<p>f. On Signal Generator, AN/URM-127, adjust front panel controls for 1000 cps signal with output amplitude which provides 30 percent modulation indication on Signal Generator, AN/USM-44, modulation meter.</p> <p>g. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT switches to 322.55.</p> <p>h. Adjust output signal frequency of Signal Generator, AN/USM-44, to point at which peak indication is observed on electronic voltmeter.</p> <p>i. On Receiver Group, ECI 03-01380-002, adjust VO LEVEL MN potentiometer R1 to point at which electronic voltmeter indicates 2.45 vrms (+10 dbm).</p> <p>j. On Signal Generator, AN/URM-127, vary output signal frequency between 300 and 3000 cps while simultaneously adjusting signal amplitude to maintain a 30 percent modulation level as indicated on Signal Generator, AN/USM-44.</p> <p>k. Using distortion analyzer measure percent of frequency distortion at modulation frequencies of 300, 1000, and 3000 cps.</p> <p>l. On Test Adapter, MX-8150/TYA-11, move test equipment input leads to test point J4-s.</p> <p>m. Connect jumper cable between test points J4-r and J4-j.</p> <p>o. Repeat step e.</p>	<p>Electronic Voltmeter</p> <p>Electronic Voltmeter</p> <p>J2-K and J2-L on Test Adapter, MX-8150/TYA-11</p> <p>J2-K and J2-L on Test Adapter, MX-8150/TYA-11</p>	<p>Peak indication</p> <p>2.45 vrms (+10 dbm)</p> <p>Audio output power shall not vary more than 2 db from 1000 cps modulation signal reference over a 300 to 3000 cps audio frequency range.</p> <p>10 percent or less</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
15 (Cont)	<p>o. On Signal Generator, AN/URM-127, adjust front panel controls for a 19,000 cps signal with an output amplitude which provides 30 percent modulation indication on Signal Generator, AN/USM-44, modulation meter.</p> <p>p. Repeat step h.</p> <p>q. On Receiver Group, ECI 03-01380-002, Adjust VO LEVEL MN potentiometer R1 to point at which electronic voltmeter indicates 1.10 vrms (+3 dbm).</p> <p>r. On Signal Generator, AN/URM-127, vary output signal frequency between 300 cps and 25,000 cps while simultaneously adjusting signal amplitude to maintain 30 percent modulation level as indicated on Signal Generator, AN/USM-44.</p> <p>s. Using distortion analyzer measure percent of frequency distortion at modulation frequencies of 300, 19,000, and 25,000 cps.</p> <p>t. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to STBY.</p> <p>u. Disconnect distortion analyzer and Signal Generator, AN/URM-127, from test setup (refer to Figure 3-13).</p> <p>v. Remove Fixed Attenuator, CN-1248/U from test setup and connect Signal Generator, AN/USM-44, to Fuse, MX-1730/U.</p> <p>w. Connect input leads of electronic voltmeter across test points J2-K and J2-L on Test Adapter, MX-8150/TYA-11.</p>	J4-S on Test Adapter, MX-8150/TYA-11	<p>1. 1.10 vrms (+3 dbm)</p> <p>Audio output power shall not vary more than ± 3 db from 19,000 modulation signal reference over a 300 cps to 25,000 cps range.</p> <p>12 percent or less</p> <p>HV indicator goes off.</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
15 (Cont)	<p>x. On signal generator adjust front panel controls for a 322.55 mcs, 1000-microvolt output signal internally modulated at 30 percent by 1000 cps.</p> <p>y. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>z. On signal generator adjust output frequency to point at which peak indication is observed on electronic voltmeter. Record electronic voltmeter decibel indication.</p> <p>aa. On signal generator adjust output signal amplitude to 3 microvolts and record decibel indication of electronic voltmeter.</p> <p>ab. On signal generator adjust output amplitude control for 1000-microvolt signal and record decibel output level indicated on electronic voltmeter.</p> <p>ac. On signal generator adjust output amplitude control for 0.1-volt output signal and record decibel indication provided on electronic voltmeter.</p> <p>ad. On signal generator adjust output signal amplitude for 0.5 volt and record decibels indication provided on electronic voltmeter.</p> <p>ae. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to STBY.</p> <p>af. Replace Fixed Attenuator, CN-1248/U between signal generator and Fuse, MX-1730/U; disconnect electronic voltmeter, and connect Oscilloscope, Fairchild 765MH between test points J2-K and J2-L on Test Adapter, MX-8150/TYA-11.</p>		<p>HV indicator lights.</p> <p>Receiver audio output shall not vary more than 3 db from indication recorded in step 15z.</p> <p>Receiver audio output shall not vary more than ± 2 db from indication of step 15ab.</p> <p>Receiver audio output shall not vary more than ± 3 db from indication of step 15 ac.</p> <p>HV indicator goes off.</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
15 (Cont)	<p>ag. On signal generator adjust front panel controls for a 322.55 mcs, 1000-microvolt output signal internally modulated at 30 percent with 1000 cps.</p> <p>ah. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>ai. On signal generator adjust output frequency controls to point at which maximum signal amplitude is displayed on oscilloscope.</p> <p>aj. On signal generator set output signal amplitude control to 0.1 microvolt (-127 dbm).</p> <p>ak. Adjust oscilloscope to display noise signals.</p> <p>al. On Receiver Group, ECI 03-01380-002, turn VO SQUELCH MN potentiometer R2 to full squelch (fully clockwise) position.</p> <p>am. On signal generator increase output signal amplitude until audio signal is displayed on oscilloscope and record amplitude level required to unsquelch receiver audio signal.</p> <p>an. On signal generator set output signal amplitude to 0.1 microvolt (-127 dbm).</p> <p>ao. On Receiver Group, ECI 03-01380-002, adjust VO SQUELCH MN potentiometer R2 to point at which noise signals just disappear from oscilloscope.</p> <p>ap. On signal generator increase output signal level to point at which audio signal is displayed on oscilloscope.</p>		<p>HV indicator lights.</p> <p>Noise signals appear with potentiometer R2 set in fully counter-clockwise position and disappear as potentiometer R2 is turned to fully clockwise position.</p> <p>Receiver shall unsquelch with an input signal not less than 5 microvolts, or more than 100 microvolts.</p> <p>Receiver shall unsquelch with input signal not exceeding 5 microvolts.</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
15 (Cont)	<p>aq. Disconnect oscilloscope from test points J2-K and J2-L on Test Adapter, MX-8150/TYA-11, and connect oscilloscope input to J4-s on Test Adapter, MX-8150/TYA-11.</p> <p>ar. Connect jumper lead between test points J4-r and J4-j on Test Adapter, MX-8150/TYA-11.</p> <p>as. Repeat steps ai thru ak.</p> <p>at. On Receiver Group, ECI 03-01380-002, turn VO SQUELCH MN potentiometer R2 fully clockwise and fully counterclockwise.</p>		In broadband operation receiver cannot be squelched. Oscilloscope shall display noise at any setting of VO SQUELCH MN potentiometer.
16	<p>Check transmitter percentage of modulation characteristics as follows:</p> <p>a. On Radio Set, AN/GRC-112 set front panel controls as outlined in paragraph 3-3e(1)(b)2.</p> <p>b. Connect test equipment and accessories as shown in Figure 3-14.</p> <p>c. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>d. On Signal Generator, AN/URM-127 adjust front panel controls for a 1000-cps audio output signal with an amplitude of 0.0775 vrms (-20 dbm) as indicated on Electronic Voltmeter, ME-30B.</p> <p>CAUTION</p> <p>DO NOT OPERATE RADIO SET, AN/GRC-112 AT RF POWER LEVELS ABOVE 1200 WATTS AS INDICATED ON METER A1M1 OF RADIO SET CONTROL, C-6621/GRC-112 OR THE BIRD 6835 TERMALINE WATTMETER MAY BE DAMAGED.</p>		READY indicator lights after maximum warmup period of 6 minutes.

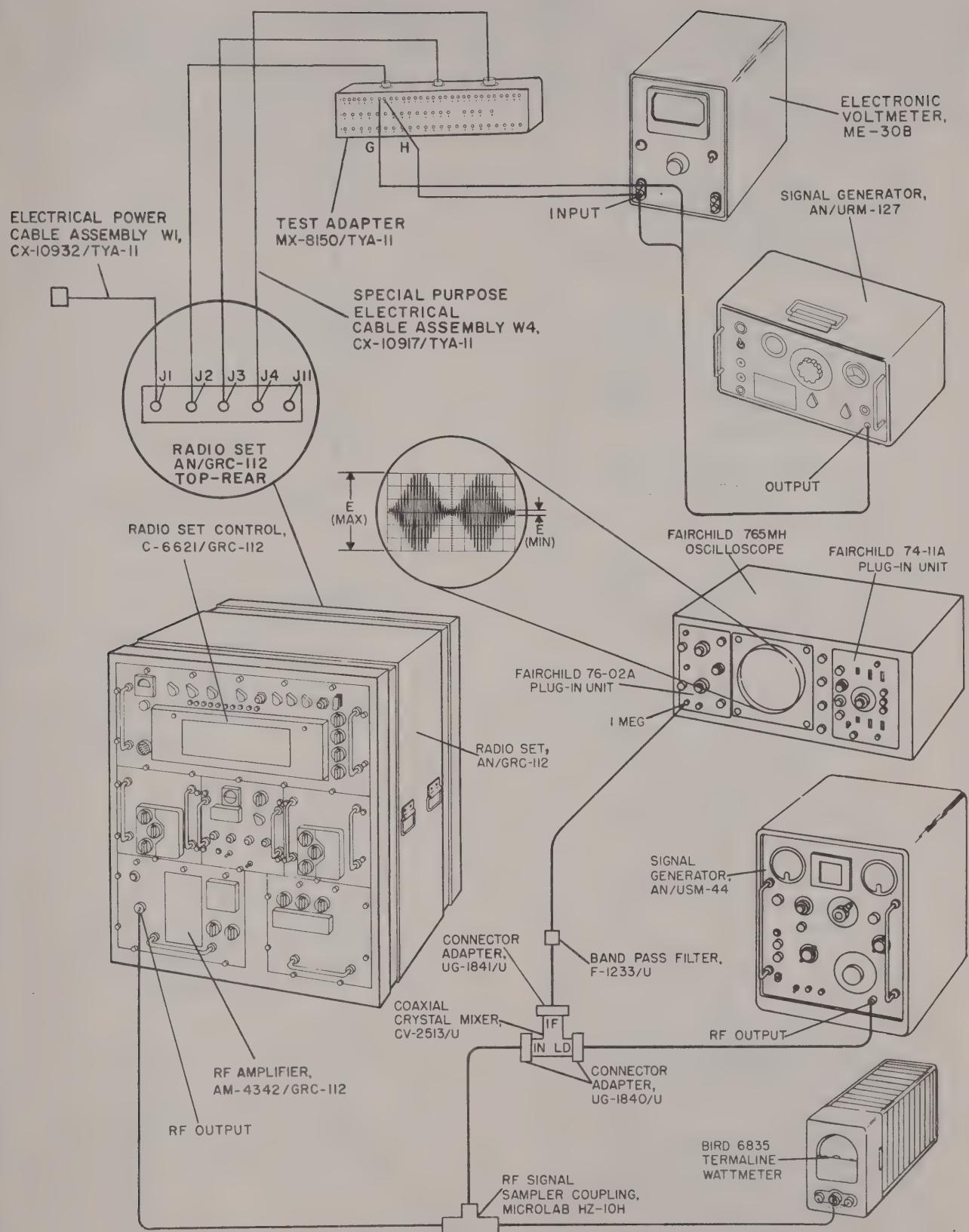


TABLE 3-13. (Continued)

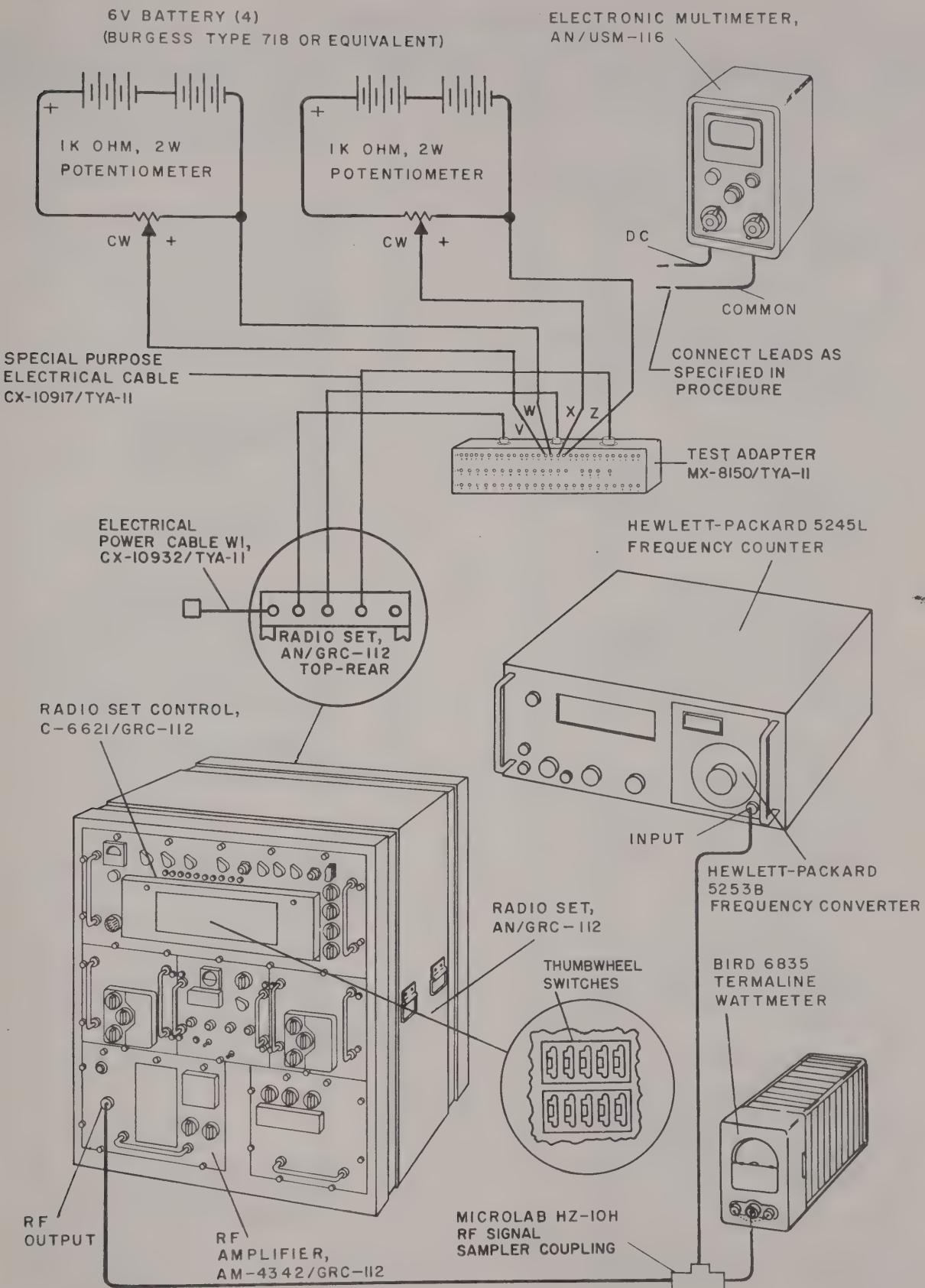
STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
16 (Cont)	<p>e. On Power Supply, PP-4351/GRC-112 set HV ON/STBY switch to HV ON.</p> <p>f. Adjust Rf Signal Sampler Coupling Microlab HZ-10H to point at which it provides a sample output of approximately 2 watts.</p> <p>g. On Radio Set Control, C-6621/GRC-112 set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 225.00 and turn TEST KEY switch to LOCK.</p> <p>h. Adjust Signal Generator, AN/USM-44 for 224.00 mcs with an amplitude of 0.1 to 0.5 volts.</p> <p>i. Adjust Fairchild 765MH Oscilloscope to display a 6 centimeter-high, amplitude modulated signal.</p> <p>j. Observe and record the peak-to-peak (E max) and valley-to-valley (E min) amplitudes of the displayed waveshapes.</p> <p>k. On Radio Set Control, C-6621/GRC-112 turn TEST KEY switch to off (center).</p> <p>l. Calculate percentage of modulation using the following formula:</p> $0/0 \text{ Mod.} = \frac{E \text{ max} - E \text{ min}}{E \text{ max} + E \text{ min}} \times 100$ <p>m. Repeat steps 16i thru 16l first with RECEIVE and TRANSMIT FREQUENCY SELECT set for 300.00 mcs and AN/USM set to 299.00 mcs, and then with RECEIVE and TRANSMIT FREQUENCY SELECT switches set to 399.95 mcs and AN/USM-44 set to 298.95 mcs.</p>		<p>HV indicator lights.</p> <p>85 to 100 percent</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
16 (Cont)	<p>n. On Signal Generator, AN/URM-127 adjust front panel controls for a 1000-cps audio output signal with an amplitude of 0.775 vrms (0 dbm) as indicated on Electronic Voltmeter, ME-30B.</p> <p>o. On Radio Set Control, C-6621/GRC-112 set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 300.00 and set AN/USM-44 to 299.00 mcs.</p> <p>p. Repeat steps 16i thru 16l.</p> <p>q. On Power Supply, PP-4351/GRC-112 set HV ON/STBY switch to STBY.</p> <p>r. Disconnect Electronic Voltmeter, ME-30B and Signal Generator, AN/URM-127 from test points J2-G and J2-H on Test Adapter, MX-8150/TYA-11 and connect AN/URM-127 and ME-30B between test points J4-g and J4-r on the Test Adapter.</p> <p>s. On Power Supply, PP-4351/GRC-112 set HV ON/STBY switch to HV ON.</p> <p>t. On Signal Generator, AN/URM-127 adjust front panel controls for a 19,000 cps output frequency with an amplitude of 4.2 ± 0.35 volts rms as indicated on the ME-30B.</p> <p>u. Repeat steps 16i thru 16l with the RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches set sequentially for 225.00, 300.00, and 399.95 mcs and the AN/USM-44 set 1 mc down for each setting.</p>		<p>85 to 100 percent</p> <p>HV indicator lights.</p> <p>85 to 100 percent of modulation for each setting</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
17	<p>Check transmitter frequency accuracy in the voice mode as follows:</p> <p>a. On Radio Set Control, C-6621/GRC-112 set front panel controls as outlined in paragraph 3-3e1(b)(2).</p> <p>b. Connect test equipment and accessories as shown in Figure 3-15.</p> <p style="text-align: center;">Note</p> <p>DO NOT CONNECT BATTERY LEADS OR ELECTRONIC MULTIMETER, AN/USM-116 AT THIS TIME.</p> <p>c. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>d. When READY indicator lights set HV ON/STBY switch to HV ON.</p> <p>e. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 225.00 and set TEST KEY switch to ON.</p> <p>f. Using frequency counter, measure and record transmitter frequency.</p> <p>g. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 241.15.</p> <p>h. Repeat step 17f.</p> <p>i. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 263.25.</p>		<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>HV ON indicator lights.</p> <p>225.00 mcs ± 2.5 kc/s</p> <p>241.15 mcs ± 2.5 kc/s</p>



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Figure 3-15. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 8

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
17 (Cont)	j. Repeat step 17f. k. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 285. 30. l. Repeat step 17f. m. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 300. 00. n. Repeat step 17f. o. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 322. 55. p. Repeat step 17f. q. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 344. 60. r. Repeat step 17f. s. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 366. 75. t. Repeat step 17f. u. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 388. 80. v. Repeat step 17f. w. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 399. 95. x. Repeat step 17f.		263.25 mcs ± 2.5 kc/s 285.30 mcs ± 2.5 kc/s 300 mcs ± 2.5 kc/s 322.55 mcs ± 2.5 kc/s 344.60 mcs ± 2.5 kc/s 366.75 ± 2.5 kc/s 388.80 mcs ± 2.5 kc/s 399.95 mcs ± 2.5 kc/s

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
18	<p>Check transmitter frequency accuracy in the FSK mode as follows:</p> <p>a. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to STBY.</p> <p>b. Refer to Figure 3-15 and connect battery/potentiometer networks to Test Adapter, MX-8150/TYA-11.</p> <p>c. Using electronic multimeter, adjust each potentiometer for +10 vdc output.</p> <p>d. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>e. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 225.00 and turn MODULATION MODE switch to DATA.</p> <p>f. Using frequency counter, measure and record transmitter frequency (F1).</p> <p>g. Disconnect battery/potentiometer network leads from test points J2-V and J2-W on Test Adapter,</p> <p>h. Using frequency counter again, measure and record transmitter frequency (F2).</p> <p>i. Compute center frequency using following formula:</p> $FC = \frac{F1 + F2}{2}$ <p>j. Compute frequency deviation from each side of center frequency using following equations:</p> <p>+ Deviation = F1 - FC</p> <p>- Deviation = FC - F2</p>		<p>HV indicator lights.</p> <p>FC = 225.00 mcs ± 2.5 kc/s</p> <p>20 ± 2 kc/s</p> <p>20 ± 2 kc/s</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
18 (Cont)	k. Repeat steps a thru j with the Radio Set Control, C-6621/GRC-112, RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches set for 399.95.		± 2 kc/s + Deviation -20 ± 2 kc/s -Deviation = 20 ± 2 kc/s
19	<p>Check transmitter keying in FSK mode as follows:</p> <p>a. On Radio Set, AN/GRC-112, set front panel controls as outlined in paragraph 3-3e(1)(b)2.</p> <p>b. Connect test equipment and accessories to Radio Set, AN/GRC-112, as shown in Figure 3-16.</p> <p>c. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>d. Connect input A of test setup (Figure 3-16) to test point J2-Z on Test Adapter, MX-8150/TYA-11, and input B of the test setup to test point J2-X on the Test Adapter, MX-8150/TYA-11.</p> <p>e. Adjust test setup potentiometer for +6v indication on electronic multimeter.</p> <p>f. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>g. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches for 225.00.</p> <p>h. Adjust DATA PWR ADJ potentiometer R8, located behind front panel access cover on Power Supply, PP-4351/GRC-112, for indication of 1100 watts on Termaline Wattmeter.</p>		<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>+6v</p> <p>HV indicator lights.</p>

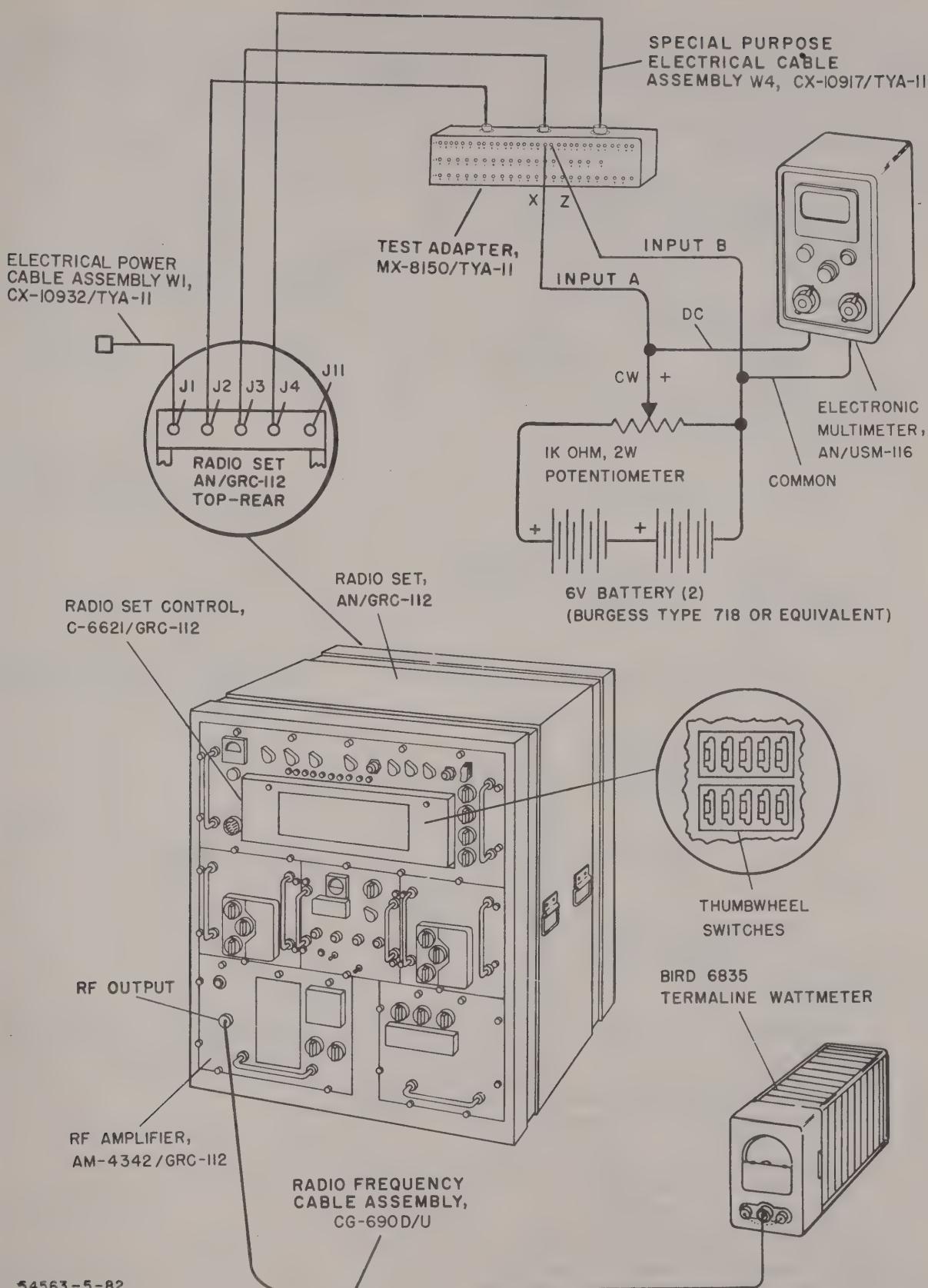
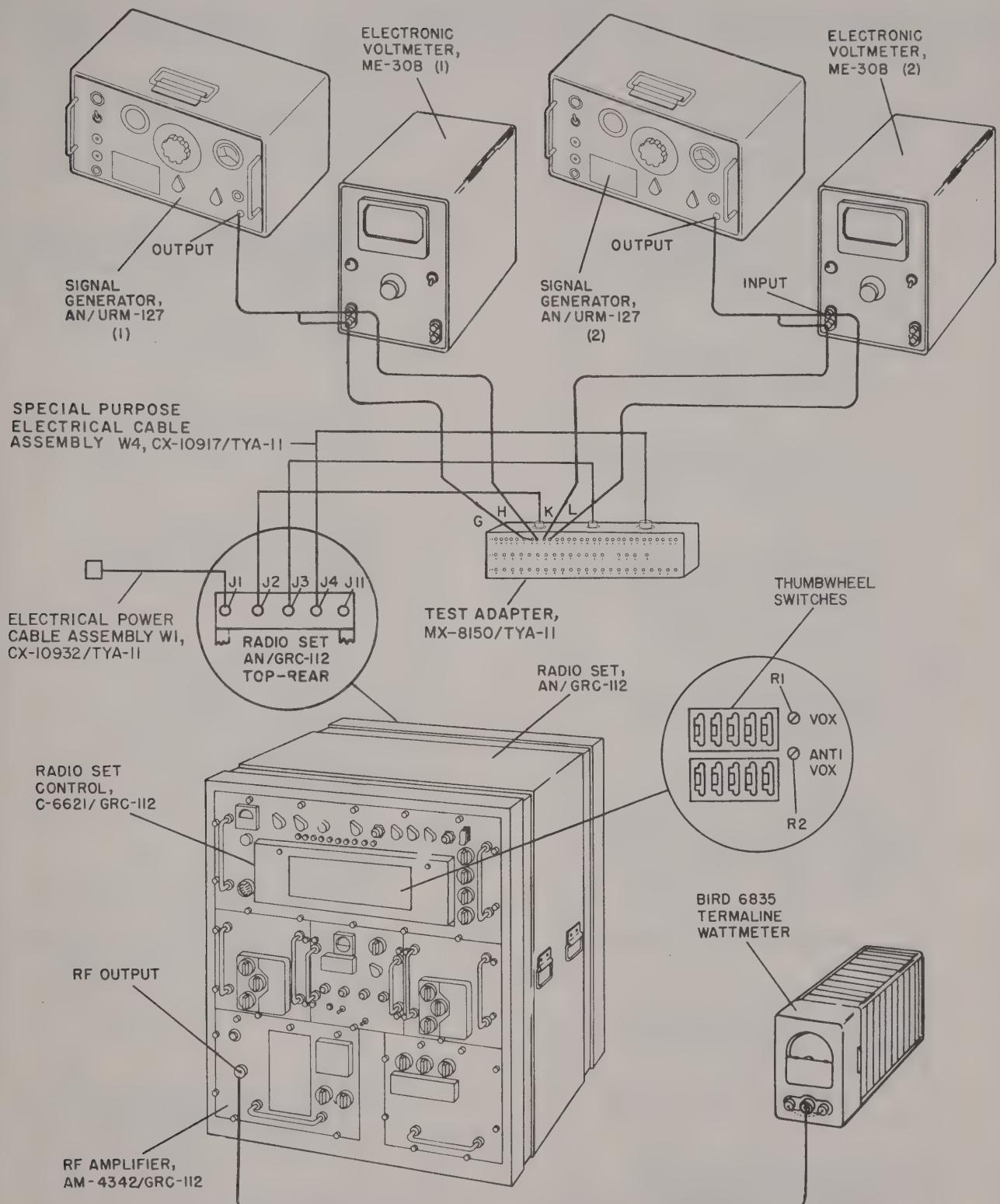


Figure 3-16. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 9

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
19 (Cont)	<p>i. Record Termaline Wattmeter indication.</p> <p>j. Adjust test setup potentiometer (Figure 3-16) to obtain +12 vdc indication on electronic multimeter.</p> <p>k. Record transmitter rf power indication of the Termaline Wattmeter.</p> <p>l. Adjust test setup potentiometer (Figure 3-16) for a +2 vdc indication on electronic multimeter.</p> <p>m. Observe Termaline Wattmeter.</p> <p>n. Reverse input A and input B connections of the test setup on Test Adapter, MX-8150/TYA-11.</p> <p>o. Observe Termaline Wattmeter.</p> <p>p. Adjust test setup potentiometer (Figure 3-16) for +12 vdc indication on electronic multimeter.</p> <p>q. Observe Termaline Wattmeter.</p> <p>r. Disconnect input A and input B leads of test setup (Figure 3-16) from Test Adapter, MX-8150/TYA-11.</p> <p>s. Observe Termaline Wattmeter.</p>		<p>1000 to 1200 watts</p> <p>1000 to 1200 watts</p> <p>Wattmeter indicates absence of transmitter rf power.</p> <p>Wattmeter indicates absence of transmitter rf power.</p> <p>1000 to 1200 watts</p> <p>Wattmeter indicates absence of transmitter rf power.</p>
20	<p>Check transmitter voice operated key capabilities as follows:</p> <p>a. On Radio Set Control, C-6621/GRC-112, set front panel controls as outlined in paragraph 3-3e(1)(b)2.</p> <p>b. Connect test equipment and accessories as shown in Figure 3-17.</p>		



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Figure 3-17. Radio Set, AN/GRC-112, Minimum Performance Standards Check, Test Setup No. 10

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
20 (Cont)	<p>c. On Radio Set Control, C-6621/GRC-112, turn both VOX potentiometer R1 and ANTI-VOX potentiometer R2 to minimum (fully counterclockwise).</p> <p>d. On Power Supply, PP-4351/GRC-112, set ON/PRIM. PWR EMER OFF circuit breaker to ON.</p> <p>e. Adjust Termaline Wattmeter for power measurements on 0 to 1200 watt scale.</p> <p>f. Adjust both Signal Generators, AN/URM-127, to provide 1000 cps, minimum amplitude output signals.</p> <p>g. Set Electronic Voltmeter, ME-30B, (#1) to measure 25 millivolts and set Electronic Voltmeter, ME-30B (#2) to measure 12.5 millivolts.</p> <p>h. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to HV ON.</p> <p>i. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 225.00 and turn TEST KEY switch to ON.</p> <p>j. Observe Termaline Wattmeter.</p> <p>k. On Radio Set Control, C-6621/GRC-112, set TEST KEY switch to off (center).</p> <p>l. Observe Termaline Wattmeter.</p> <p>m. On Radio Set Control, C-6621/GRC-112, set KEY CONTROL switch to VOX.</p>		<p>READY indicator lights after maximum warmup period of 6 minutes.</p> <p>HV indicator lights.</p> <p>Wattmeter indicates presence of transmitter rf output power.</p> <p>Wattmeter indicates absence of transmitter rf output power.</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
20 (Cont)	<p>n. Adjust output signal amplitude of Signal Generator, AN/URM-127 (#1) for an indication of 25 ± 2.0 millivolts on electronic voltmeter (#1).</p> <p>o. On Radio Set Control, C-6621/GRC-112, slowly turn VOX potentiometer R1 clockwise to point at which transmitter turns on. (Termaline Wattmeter indicates presence of rf output power.)</p> <p>p. On Radio Set Control, C-6621/GRC-112, turn VOX potentiometer fully counterclockwise.</p> <p>q. Adjust signal generator (#2) for output signal amplitude of 12.5 ± 2.0 millivolts as indicated on electronic voltmeter (#2).</p> <p>r. While slowly turning ANTI-VOX potentiometer R2 clockwise, alternately increase and decrease output signal amplitude of signal generator (#1) between minimum and 25 millivolts until the point is reached at which the transmitter does not turn on.</p> <p>s. On Radio Set Control, C-6621/GRC-112, turn ANTI-VOX potentiometer R2 fully counterclockwise.</p> <p>t. Adjust electronic voltmeters (#1) and (#2) to measure 70 millivolts and 35 millivolts, respectively.</p> <p>u. Adjust output signal amplitude of signal generator (#1) for indication of 70 millivolts on electronic voltmeter (#1).</p> <p>v. Adjust signal generator (#2) for minimum output signal amplitude.</p>		<p>Transmitter turns on with 25 millivolt VOX input signal.</p> <p>Termaline Wattmeter indicates absence of transmitter rf output power when electronic voltmeter (#1) indicates 70 millivolts.</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
20 (Cont)	<p>w. Slowly turn VOX potentiometer clockwise to point at which transmitter turns on. (Termaline Wattmeter indicates presence of rf output power.)</p> <p>x. Turn VOX potentiometer R1 fully counterclockwise.</p> <p>y. Adjust signal generator (#2) to provide output signal amplitude of 35 millivolts as indicated on electronic voltmeter (#2).</p> <p>z. While slowly turning ANTI-VOX potentiometer R2 clockwise alternately increase and decrease output signal amplitude of signal generator (#1) between minimum and 70 millivolts until point is reached at which transmitter does not turn on, (Termaline Wattmeter indicates absence of rf output power) when electronic voltmeter (#1) indicates 70 millivolts.</p> <p>aa. On Radio Set Control, C-6621/GRC-112, turn VOX potentiometer R1 and ANTI-VOX potentiometer R2 fully counterclockwise.</p> <p>ab. Disconnect all test equipment and accessories, except Electrical Power Cable Assemblies W1, CX-10932/TYA-11 and W4, CX-10917/TYA-11, and Test Adapter, MX-8150/TYA-11, from Radio Set, AN/GRC-112.</p>		<p>VOX potentiometer R1 turns on transmitter with 70 millivolt VOX input signal.</p> <p>ANTI-VOX potentiometer R2 does not turn on transmitter with 35 millivolt ANTI-VOX and 70 millivolt VOX input signals.</p>
21	<p>Check transmitter tuning SER-VO functional section as follows:</p> <p>a. On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to STBY.</p> <p>b. On Radio Frequency Amplifier, AM-4342/GRC-112, remove 28V/15A fuse.</p>		HV indicator goes off.

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
21 (Cont)	<p>c. On Radio Set Control, C-6621/GRC-112, set TRANSMIT FREQUENCY SELECT thumbwheel switches to a new frequency.</p> <p>d. Replace 28V/5A fuse in Radio Frequency Amplifier, AM-4342/GRC-112.</p>		On Radio Set Control, C-6621/GRC-112, SERVO OPR/MALFUNCTION indicator lights while Radio Set, AN/GRC-112 is channeling and extinguishes when channeling is complete.
22	<p>Check transmitter tuning servo functional section (IPA channeling) as follows:</p> <p>a. Remove +28 VDC fuse from Amplifier Assembly, AM-4343/GRC.</p> <p>b. On Radio Set Control, C-6621/GRC-112, set TRANSMIT FREQUENCY SELECT thumbwheel switches to a new frequency.</p> <p>c. Replace +28 VDC fuse in Amplifier Assembly, AM-4343/GRC.</p>		On Radio Set Control, C-6621/GRC-112, SERVO OPR/MALFUNCTION indicator lights while Radio Set, AN/GRC-112 is channeling and extinguishes when channeling is complete.
23	<p>Check transmitter tuning servo functional section (synthesizer channeling) as follows:</p> <p>a. On Receiver-Synthesizer, O-1282(V)/GRC, remove +28V fuse.</p> <p>b. On Radio Set Control, C-6621/GRC-112, set TRANSMIT FREQUENCY SELECT thumbwheel switches to a new frequency.</p> <p>c. Replace +28V fuse in Receiver-Synthesizer, O-1282(V)/GRC.</p>		On Radio Set Control, C-6621/GRC-112, SERVO OPR/MALFUNCTION indicator lights while Radio Set, AN/GRC-112 is channeling and extinguishes when channeling is complete.
24	Check the vfo frequency associated with each of 20 crystals of transmitter incremental oscillator as follows:		

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
24 (Cont)	<p>a. Connect Frequency Counter, HP-5245L, with a Frequency Converter Plug-In Unit, HP-5253B to test point A5A1A1 TP16 (TP16 VFO FREQ) on front panel of Synthesizer- Receivers, O-1282(V)/GRC.</p> <p>b. On Radio Set Control, C-6621/GRC-112, Set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to positions indicated below and check frequency indications on frequency counter:</p> <p>225.00 232.15 241.15 252.20 263.25 274.35 285.30 296.40 299.45 300.00 311.55 322.55 333.60 344.60 355.75 366.75 377.80 388.80 398.95 399.95</p> <p>Note IF VFO FREQUENCIES CAN- NOT BE MEASURED DUE TO LOW SIGNAL AMPLITUDE, MEASURE FREQUENCIES AS OUTLINED IN TABLE 3-17.</p>	A5A1A1TP16	46.2500 mcs 48.0375 mcs 50.2875 mcs 53.0500 mcs 55.8125 mcs 58.5875 mcs 61.3250 mcs 64.1000 mcs 64.8625 mcs 65.0000 mcs 67.8875 mcs 70.6375 mcs 73.4000 mcs 76.1500 mcs 78.9375 mcs 81.6875 mcs 84.4500 mcs 87.2000 mcs 89.7375 mcs 89.9875 mcs
25	<p>Check transmitter SERVO amplifiers as follows:</p> <p>a. Measure voltage at test point TP2 of Electronic Control Amplifier, A4A1, using Electronic Multimeter, AN/USM-116.</p>	A4A1TP2	0 vdc

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
25 (Cont)	<p>b. Measure voltage at test point TP2 of Electronic Control Amplifier, A4A2, using electronic multimeter.</p> <p>c. Measure voltage at test point TP2 of Electronic Control Amplifier, A2A3A2, using electronic multimeter.</p>	A4A2TP2 A2A3A2TP2	0 vdc 0 vdc
26	<p>Check transmitter frequency selection functional section as follows:</p> <p>a. On Radio Set Control, C-6621/GRC-112, set RECEIVE and TRANSMIT FREQUENCY SELECT thumbwheel switches to 300.00.</p> <p>b. Using the Multimeter, AN/PSM-4 measure ac voltage at test points J4-A, -C, -E, -J, and -p on Test Adapter, MX-8150/TYA-11, with respect to test point J4-G of Test Adapter, MX-8150/TYA-11.</p> <p>c. Using Multimeter measure dc voltage at test points J4-M and J4-L on Test Adapter, MX-8150/TYA-11, with respect to test points J4-s on Test Adapter, MX-8150/TYA-11.</p>		J4-A = 0 vac J4-C = 0 vac J4-E = 0 vac J4-J = 34.2 to 41.8 vac J4-p = 10.8 vac J4-M = 28 vdc J4-L = 0 vdc
27	<p>Check tenths digit circuitry of transmitter frequency selection functional section as follows:</p> <p>a. Using Special Purpose Cable Assembly W51, extend Radio Set Control, C-6621/GRC-112, from Electrical Equipment Cabinet, CY-4676/GRC-112, and using Module Extender, PL-1232/TYA-11, extend Hundreds, Tents, Tents Switch Relay, ECI 61-00510-001 (A1A5) from Radio Set Control, C-6621/GRC-112.</p>		

TABLE 3-13. (Continued)

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
29 (Cont)	b. Repeat step 24b.	A3A2A1A1TP16	Same as step 24b
30	<p>Check receiver frequency selection functional section as follows:</p> <p>a. Using Multimeter, measure ac voltage at test points J3-A, -C, -E, -J, and -M on Test Adapter, MX-8150/TYA-11, with respect to test point J3-G on the Test Adapter, MX-8150/TYA-11.</p> <p>b. Using Multimeter, measure dc voltage at test points J3-T and J3-U on Test Adapter, MX-8150/TYA-11, with respect to J3-b (ground) on Test Adapter, MX-8150/TYA-11.</p>		<p>J3-A = 0 vac J3-C = 0 vac J3-E = 0 vac J3-J = 36 to 40 vac J3-M = 41.5 to 49.5 vac</p> <p>J3-T = 0 vdc J3-U = 28 vdc</p>
31	<p>Check tenths digit circuitry of receiver frequency selection functional section as follows:</p> <p>a. Using Special Purpose Cable Assembly W51, extend Radio Set Control, C-6621/GRC-112, from Electrical Equipment Cabinet, CY-4676/GRC-112, and using Modulation Extender, PL-1232/TYA-11, extend Hundreds, Tenth, Hundreds Switch Relay, ECI 61-00510-001 (A1A8) from the Radio Set Control, C-6621/GRC-112.</p> <p>b. Using Multimeter, measure dc voltage at terminals of connector A1A8P1 identified below:</p> <p>P1-a P1-c P1-e P1-D P1-F P1-J P1-L P1-N P1-T P1-W P1-Y</p>		<p>0 vdc 28 vdc 0 vdc</p>

TABLE 3-13. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
31 (Cont)	<p>c. Replace ECI 61-00510-001 and using Module Extender, PL-1232/TYA-11, extend Relay Selector, ECI 61-00511-001 (A1A3) from Radio Set Control, C-6621/GRC-112.</p> <p>d. Using Multimeter, measure dc voltage at connector terminal A1A3P1-B.</p> <p>e. Replace Relay Selector, ECI 61-00511-001 (A1A3) in Radio Set Control, C-6621/GRC-112, and replace Radio Set Control, C-6621/GRC-112, in Electrical Equipment Cabinet, CY-4676/GRC-112.</p>		0 vac
32	Using electronic multimeter, measure receiver servomotor drive signal at test point TP2 of Electronic Control Amplifier, A3A2A1A2.	A3A2A1A2TP2	0 vac
33	On Power Supply, PP-4351/GRC-112, set HV ON/STBY switch to STBY and set ON/PRIM. PWR EMER OFF switch to PRIM. PWR EMER OFF position.		HV indicator and READY indicator on Power Supply, PP-4351/GRC-112, go off.
34	Disconnect all test equipment, test cables, and accessories from Radio Set, AN/GRC-112.		

2 Connect the Test Adapter and the ancillary test equipment, test cables, and accessories as shown in Figure 3-18.

Note

FIGURE 3-18 ILLUSTRATES THE PRELIMINARY TEST SETUP REQUIREMENTS. ADDITIONAL TEST SETUP REQUIREMENTS ARE ITEMIZED IN THE DETAILED OPERATING PROCEDURES.

(c) Operating Procedures. The operating procedures for using Test Adapter to check minimum performance standards of a Radio Set are provided in Table 3-14. If an abnormal indication is detected refer to the troubleshooting and maintenance instructions for Radio Set, AN/GRC-134, provided in TM-04437A-35/2, Maintenance and Overhaul Manual.

(3) Test Adapter, MX-8152/TYA-11, Test Procedures. The operating instructions for using Test Adapter, MX-8152/TYA-11 to test the operation of Antenna Coupler, CU-1406/GRC, and Tuned Cavity, FR-173/GRC, are composed of a list of ancillary test equipment and accessories, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following ancillary test equipment, cables, and accessories are required when using the Test Adapter, to test the operation of the Antenna Coupler and the Tuned Cavity:

Note

ITEMS 1 THROUGH 8 BELOW ARE PART OF COMMUNICATIONS TEST KIT, MK-1102/TYA-11.

1. Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11

2. Special Purpose Electrical Cable Assembly W8, CX-11733/TYA-11

3. Radio Set Control, C-3811/AR

4. RF Detector, RF-229/U

5. Connector to Connector Adapter, UG-1842/TYA-11

6. Adapter, UG-29B/U

7. Fixed Attenuator, CN-1249/U

8. Test cables and accessories as required

9. Signal Generator, AN/USM-44

10. Fuse, MX-1730/U

11. Frequency Counter, Hewlett-Packard 5245L

12. Frequency Converter, Hewlett-Packard 5253B

13. Standing Wave Indicator, Hewlett-Packard 415B.

(b) Test Setup. To prepare for testing the operation of an Antenna Coupler with the Test Adapter, proceed as follows:

1 On Test Adapter, set all front panel toggle switches to the OFF (down) position.

2 On Radio Set Control, set front panel controls as follows:

Control	Position
OFF/PRESET/MAN switch	OFF
PRESET SELECT switches	1
AM/FM switch	AM.

3 On Antenna Coupler, turn CAVITY switch to FWD.

4 Using Special Purpose Electrical Cable Assembly W3, connect plug J1401 on Radio Set Control to jack J1 on Test Adapter (refer to Figure 3-19).

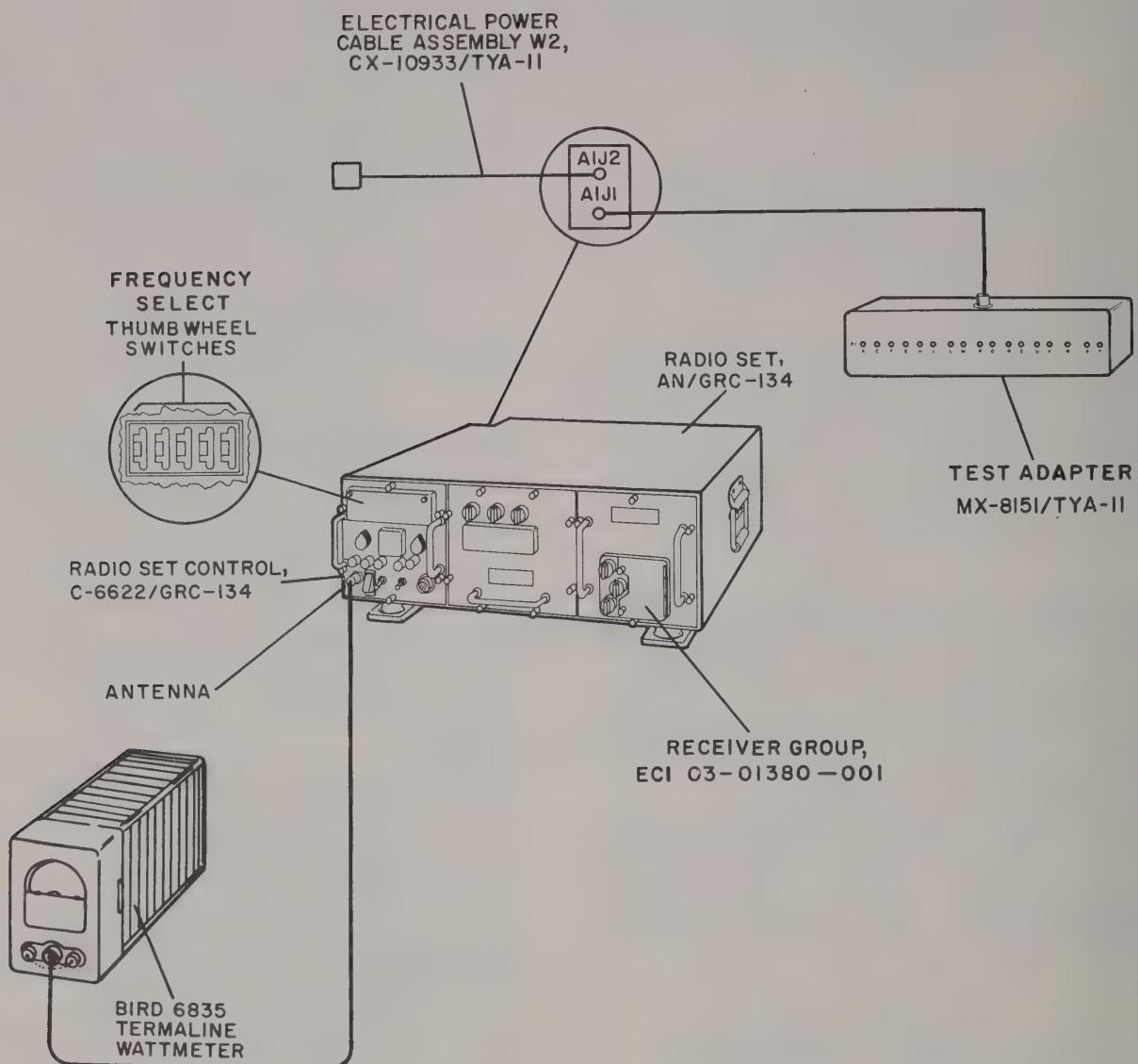
5 Connect plug P2 of Test Adapter to jack J5 on Antenna Coupler.

6 Connect plug P1 of Test Adapter to the control input jack associated with the Tuned Cavity to be tested as follows:

Cavity	Control Input Jack
1	J1
2	J2
3	J3
4	J4

7 Connect plug P3 of Test Adapter to the primary power source (115 vac, 400 cps, ØA and ØB).

8 Interconnect the ancillary test equipment and accessories as shown in Figure 3-19.



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Figure 3-18. Radio Set, AN/GRC-134, Minimum Performance Standards Check, Preliminary Test Setup

Note

FIGURE 3-19 ILLUSTRATES THE PRELIMINARY TEST SETUP REQUIREMENTS. CHANGES OR ADDITIONS TO THE TEST SETUP ARE IDENTIFIED WHERE APPLICABLE IN THE OPERATING PROCEDURES.

(c) Operating Procedures. The operating procedures for using the Test Adapter to test the minimum performance standards of an Antenna Coupler are provided in Table 3-15. If an abnormal indication is detected, refer to the troubleshooting and maintenance instructions for

Antenna Coupler, CU-1406/GRC, in TM-04165A-35/2, Maintenance and Overhaul Manual for Communications Central Group, AN/TYA-11.

Note

THE FOLLOWING PROCEDURES IDENTIFY THE TESTING OF A SINGLE TUNED CAVITY IN THE ANTENNA COUPLER. TO TEST THE REMAINING CAVITIES, CONNECT PLUG P3 OF TEST ADAPTER TO THE APPLICABLE CONNECTOR ON THE ANTENNA COUPLER (REFER TO PARAGRAPH 3-3e(3)(b)6).

TABLE 3-14. TEST ADAPTER, MX-8151/TYA-11, OPERATING INSTRUCTIONS

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	Verify test setup instructions of paragraph 3-3e(2)(b) have been accomplished.		
2	On Radio Set Control, C-6622/GRC-134, set PRIMARY PWR ON/EMERGENCY OFF to PRIMARY PWR ON.		PRIMARY PWR ON indicator lights after maximum warmup period of 45 seconds.
3	Connect Signal Generator, AN/URM-127 to test points P1-X and P1-Y (AUDIO INPUT) of Test Adapter, MX-8151/TYA-11.		
4	Adjust signal generator front panel controls for a 1000 cps output signal frequency with amplitude of 0.775 vrms.		
5	Connect jumper lead between test points P1-L and P1-M (KEY LINE) on Test Adapter.		
6	On Radio Set Control, set HV ON/STBY to HV ON.		On Radio Set Control front panel status meter reads approximately 50 watts.
7	On Radio Set Control, turn METER SEL switch to PCT MOD.		On Radio Set Control front panel status meter indicates modulation.
8	Remove jumper lead from test points P1-L and P1-M (KEY LINE) on Test Adapter.		
9	Remove signal generator from test points P1-X and P1-Y (AUDIO INPUT) and connect between test points P1-W (WB AUDIO IN), P1-G (-28 VDC) on Test Adapter.		
10	Adjust signal generator for an output frequency of 19,000 cps with a signal amplitude of 4.25 vrms.		
11	Connect jumper lead between test points P1-A (WB KEY) and P1-G (-28 VDC) on Test Adapter.		

TABLE 3-14. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
12	On Radio Set Control, turn METER SEL switch to FWD PWR.		
13	Connect jumper lead between test points P1-L and P1-M (KEY LINE) on Test Adapter.		On Radio Set Control front panel status meter indicates approximately 50 watts.
14	On Radio Set Control, turn METER SEL switch to PCT MOD.		Front panel status meter shall indicate modulation.
15	On Test Adapter, MX-8151/TYA-11, remove jumper leads from between test points P1-L and P1-M (KEY LINE) and from between P1-A (WB KEY) and P1-G (-28 VDC) and remove signal generator.		
16	Connect Electronic Multimeter, AN/USM-116, to test points P1-U and P1-V (TEST IND) on Test Adapter.		
17	Set electronic multimeter to OHMS.		
18	On Radio Set Control, turn KEY CONTROL switch to NORM.	J1-U/J1-V	Electronic multimeter indicates open circuit.
19	On Radio Set Control, turn KEY CONTROL switch to TEST.		Electronic multimeter reads 0 ohms.
20	On Radio Set Control, set HV ON/STBY switch to STBY and set PRIMARY PWR ON/EMERGENCY OFF switch to EMERGENCY OFF.		PRIMARY PWR indicator goes off.
21	Connect electronic multimeter between test points P1-R and P1-S (POWER IND) on Test Adapter, MX-8151/TYA-11.		Electronic multimeter indicates an open.
22	On Radio Set Control, set PRIMARY PWR ON/EMERGENCY OFF switch to PRIMARY PWR ON.		Electronic multimeter reads 0 ohms after PRIMARY PWR indicator lights.
23	On Radio Set Control, set PRIMARY PWR ON/EMERGENCY OFF switch to EMERGENCY OFF.		PRIMARY PWR indicator goes off.

TABLE 3-14. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
24	Disconnect Termaline Watt-meter.		
25	Connect Signal Generator, AN/USM-44, to ANTENNA connector on Radio Set Control.		
26	On Radio Set Control, set PRIMARY PWR ON/EMERGENCY OFF switch to PRIMARY PWR ON.		PRIMARY PWR indicator lights after maximum warmup period of 45 seconds.
27	Adjust Signal Generator, AN/USM-44, for 225.00 mcs, 10-microvolt output signal modulated at 30 percent by 1000 cps.		
28	Connect oscilloscope to test points J1-H and J1-J (AUDIO OUT) on Test Adapter.		Oscilloscope displays a 1000 cps audio signal.
29	Adjust frequency of Signal Generator, AN/USM-44, output signal for 300 mcs.		
30	On Radio Set Control, set Channel Frequency Select switches to 300.00.		Oscilloscope displays a 1000 cps audio signal.
31	Adjust frequency of Signal Generator, AN/USM-44, output signal of 399.95 mcs.		
32	On Radio Set Control, set Channel Frequency Select switches to 399.95.		Oscilloscope displays a 1000 cps audio signal.
33	Reset Channel Frequency Select switches to 225.00.		
34	Adjust frequency of Signal Generator, AN/USM-44, output signal for 225.00 mcs.		
35	Connect a test lead between test points P1-A (WB KEY) and P1-G (-28 VDC) on Test Adapter.		
36	Connect the oscilloscope between test points P1-E (WB AUDIO OUT) and P1-G (-28 VDC) on Test Adapter.	P1-E	Oscilloscope displays a 1000 cps audio signal.

TABLE 3-14. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION								
37	Repeat steps 29 thru 31.		Same as steps 29 thru 31								
38	Remove Signal Generator, AN/USM-44, and connect electronic multimeter between P1-F (+28 VDC) and P1-G (-28 VDC) on Test Adapter. Also connect Ter maline Wattmeter to ANTENNA connector on Radio Set Control.		AN/USM-116 shall read +28 ±1.4 vdc.								
39	On Radio Set Control, set front panel controls as follows: <table style="margin-left: 100px;"><tr><th><u>Control</u></th><th><u>Position</u></th></tr><tr><td>KEY CONTROL switch</td><td>TEST</td></tr><tr><td>HV ON/STBY switch</td><td>HV ON</td></tr><tr><td>METER SEL switch</td><td>FWD PWR</td></tr></table>	<u>Control</u>	<u>Position</u>	KEY CONTROL switch	TEST	HV ON/STBY switch	HV ON	METER SEL switch	FWD PWR		
<u>Control</u>	<u>Position</u>										
KEY CONTROL switch	TEST										
HV ON/STBY switch	HV ON										
METER SEL switch	FWD PWR										
40	Connect jumper lead between test jacks P1-P and P1-Q (TEST KEY) on Test Adapter.		On Radio Set Control front panel status meter reads approximately 50 watts.								
41	On Radio Set Control, set HV ON/STBY switch to STBY and set PRIMARY POWER ON/EMERGENCY OFF switch to EMERGENCY OFF.										
42	Disconnect all test equipment, test cables, and accessories.										

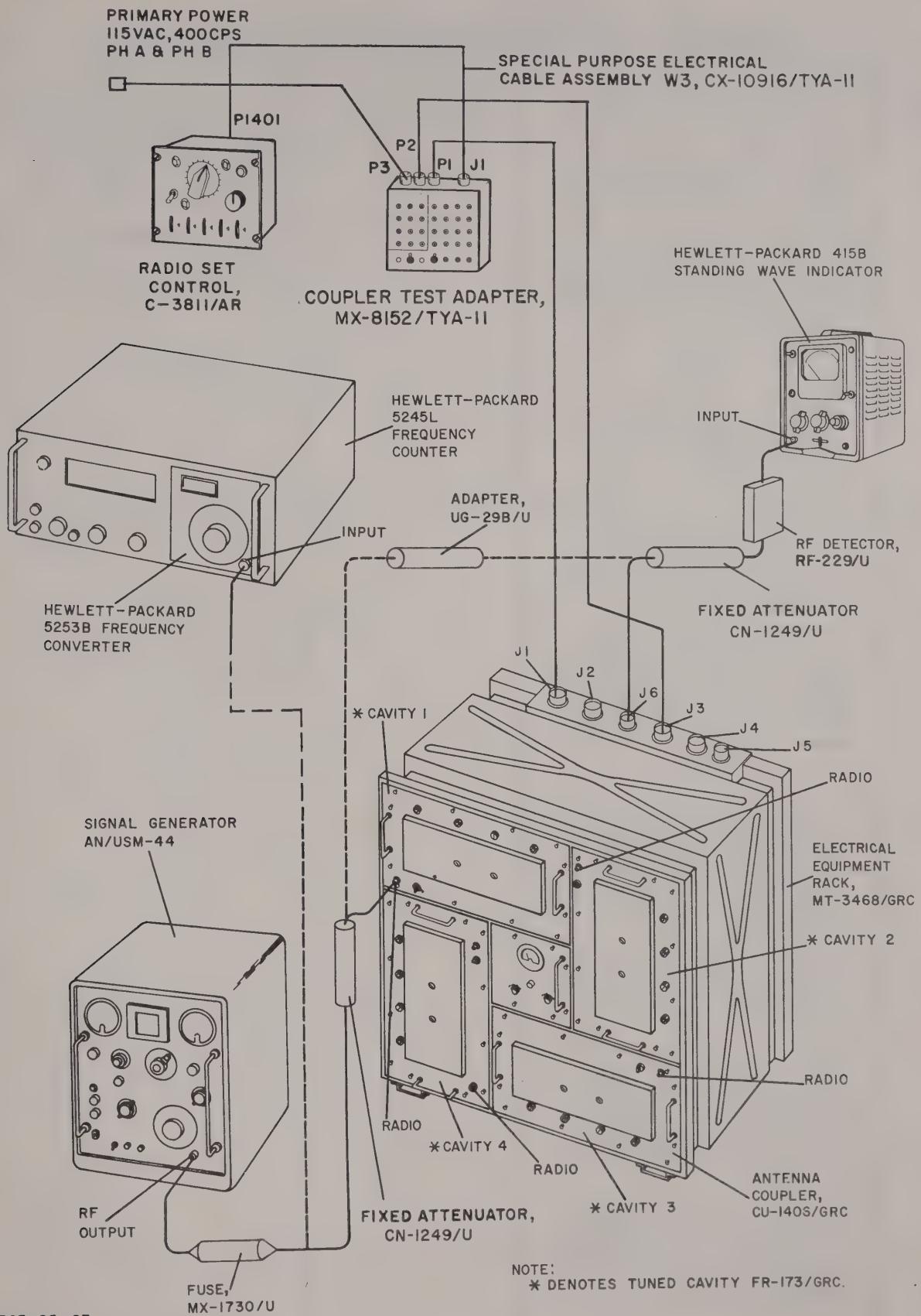


Figure 3-19. Antenna Coupler, CU-1406/GRC, Minimum Performance Standards Check, Preliminary Test Setup

TABLE 3-15. OPERATING INSTRUCTIONS FOR TEST ADAPTER,
MX-8152/TYA-11, WHEN TESTING ANTENNA COUPLER, CU-1406/GRC

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	On Test Adapter set AC ON/OFF and DC ON/OFF switches to ON.		AC and DC indicators light.
2	On Radio Set Control set OFF/PRESET/MAN switch to PRESET and turn PRESET SELECT switch to 12. Note ALLOW A 10-MINUTE WARMUP AND STABILIZATION PERIOD BEFORE PROCEEDING.		
3	<u>Insertion Loss Test.</u> Measure loss at selected operating frequencies within 225.00 to 399.95 mcs range as follows: <ol style="list-style-type: none"> With signal generator connected to frequency counter, Figure 3-19, adjust signal generator for output frequency of 225.00 mcs as indicated on frequency counter. Note A SIGNAL AMPLITUDE OF AT LEAST 100 MILLIVOLTS IS REQUIRED TO DRIVE FREQUENCY COUNTER FOR FREQUENCY MEASUREMENTS. On Radio Set Control turn PRESET SELECT switch to position 1. Disconnect signal generator from frequency counter and connect signal generator to RADIO input of cavity 1 on Antenna Coupler (refer to Figure 3-19). Adjust controls of signal generator for 70 millivolt output signal modulated 40 percent at 1000 cps. 		

TABLE 3-15. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION										
3 (Cont)	<p>e. Vary output frequency of signal generator slightly to obtain maximum output indication on standing wave indicator.</p> <p>f. Readjust output signal amplitude and modulation level of signal generator to 70 millivolts and 40 percent respectively.</p> <p>g. On standing wave indicator set INPUT SELECTOR switch to 200, $K\Omega$ XTAL RANGE switch to 50 DB, and METER SCALE switch to EXPAND.</p> <p>h. Disconnect Fixed Attenuators from Antenna Coupler and connect to each other through Adapter, UG-29B/U (refer to Figure 3-19).</p> <p>i. On standing wave indicator adjust GAIN control for zero indication on EXPANDED DB SCALE of front panel meter.</p> <p>j. Remove Adapter from test setup and reconnect Fixed Attenuators to Antenna Coupler as shown in Figure 3-19.</p> <p>k. Observe and record insertion loss as indicated on EXPANDED DB scale of standing wave indicator.</p> <p>l. Repeat steps 3a thru 3k with signal generator adjusted sequentially for 263.25, 300.00, 366.75, and 399.95 mcs; and with PRESET SELECT switch on Radio Set Control set to position corresponding to test frequency as indicated below:</p> <table> <thead> <tr> <th>Frequency</th> <th>Position</th> </tr> </thead> <tbody> <tr> <td>263.25 mcs</td> <td>5</td> </tr> <tr> <td>300.00 mcs</td> <td>10</td> </tr> <tr> <td>366.75 mcs</td> <td>16</td> </tr> <tr> <td>399.95 mcs</td> <td>20</td> </tr> </tbody> </table>	Frequency	Position	263.25 mcs	5	300.00 mcs	10	366.75 mcs	16	399.95 mcs	20		<p>Insertion loss not to exceed 1.3 db.</p> <p>Insertion loss not to exceed 1.3 db for any test frequency.</p>
Frequency	Position												
263.25 mcs	5												
300.00 mcs	10												
366.75 mcs	16												
399.95 mcs	20												

TABLE 3-15 (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
3 (Cont)	m. Repeat steps 3a thru 3l for cavities 2, 3, and 1 or 4 of Antenna Coupler as required (refer to paragraph 3-3e(3)(b)6).		
4	<p>Selectivity Test. Check selectivity of cavity 1 of Antenna Coupler as follows:</p> <p>a. Interconnect Antenna Coupler, Test Adapter, and ancillary test equipment as shown in Figure 3-19.</p> <p>b. Repeat steps 3a thru 3g and 3i.</p> <p>c. Maintain 70 millivolt signal amplitude and 40 percent modulation level, and slowly decrease output frequency to point at which 1 db is indicated on EXPANDED DB scale of standing wave indicator.</p> <p>d. Using frequency counter measure and record low-side 1 db point frequency (refer to Note of step 3a).</p> <p>e. Set METER SCALE switch on standing wave indicator to NORMAL.</p> <p>f. Decrease output frequency of signal generator to point at which 6 db is indicated on DB scale of standing wave indicator.</p> <p>g. Using frequency counter measure and record low-side 6 db frequency.</p> <p>h. Increase output frequency of signal generator above 225.00 mcs to point at which 6 db is indicated on DB scale of standing wave indicator.</p> <p>i. Using frequency counter measure and record high-side 6 db frequency.</p>		

TABLE 3-15. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION										
4 (Cont)	<p>j. Decrease output frequency of signal generator to point at which standing wave indicator indicates less than 2 db.</p> <p>k. On standing wave indicator set METER SCALE switch to EXPAND and continue decreasing output frequency of the AN/USM-44 to point at which standing wave indicator indicates 1 db on EXPANDED DB scale.</p> <p>l. Using frequency counter measure and record high-side 1 db frequency.</p> <p>m. Determine 1 db down bandpass by subtracting recorded low-side 1 db frequency, step 4l.</p> <p>n. Determine 6 db down bandpass by subtracting recorded low-side 6 db frequency, step 4i.</p> <p>o. Determine mean center frequency by adding low-side 1 db frequency, step 4d, and high-side 1 db frequency, step 4l, and divide sum by 2.</p> <p>p. Repeat steps 4a thru 4o with the AN/USM-44 adjusted sequentially for 263.25, 300.00, 366.75, and 399.95 mcs and with PRESET SELECT switch on Radio Set Control set to position corresponding to test frequency as indicated below:</p> <table> <thead> <tr> <th>Frequency</th> <th>Position</th> </tr> </thead> <tbody> <tr> <td>263.25 mcs</td> <td>5</td> </tr> <tr> <td>300.00 mcs</td> <td>10</td> </tr> <tr> <td>366.75 mcs</td> <td>16</td> </tr> <tr> <td>399.95 mcs</td> <td>20</td> </tr> </tbody> </table> <p>q. Repeat steps 4a thru 4p for cavities 2, 3, and 4 of Antenna Coupler as required (refer to paragraph 3-3e3(b)6).</p>	Frequency	Position	263.25 mcs	5	300.00 mcs	10	366.75 mcs	16	399.95 mcs	20		<p>Bandpass at least 200 kc/s wide at 1 db down points.</p> <p>Bandpass at least 400 kc/s wide at 6 db down points.</p> <p>Mean center frequency within ± 50 kc/s of assigned test frequency</p> <p>Bandpass shall be at least 200 kc/s wide at db down points and 400 kc/s wide at 6 db down points for each test frequency.</p>
Frequency	Position												
263.25 mcs	5												
300.00 mcs	10												
366.75 mcs	16												
399.95 mcs	20												

(d) Tuned Cavity, FR-173/GRC, Test Set-up. To prepare for testing the operation of Tuned Cavity, FR-173/GRC, with Test Adapter, MX-8152/TYA-11, proceed as follows:

1 On Test Adapter, set all front panel toggle switches to the OFF (down) position.

2 On Radio Set Control, set front panel controls as follows:

<u>Control</u>	<u>Position</u>
OFF/PRESET/MAN switch	OFF
PRESET SELECT switch	1
AM/FM switch	AM.

3 Using Special Purpose Electrical Cable Assembly W3, connect plug J1401 on Radio Set Control to jack J1 on Test Adapter (refer to Figure 3-20).

4 Connect plugs P1 and P2 of Test Adapter to P1 and P2, respectively, of Special Purpose Electrical Cable Assembly W8. Connect P3 of Special Purpose Electrical Cable Assembly W8 to P1 on Tuned Cavity.

5 Connect Connector-to-Connector Adapter, UG-1842/TYA-11, to J7 on Tuned Cavity as shown in Figure 3-20.

6 Connect plug P3 of Test Adapter to the primary power source (115 vac, 400 cps, \emptyset A and \emptyset B).

7 Interconnect the ancillary test equipment and accessories as shown in Figure 3-20.

Note

FIGURE 3-20 ILLUSTRATES THE PRELIMINARY TEST SETUP REQUIREMENTS. CHANGES OR ADDITIONS TO THE TEST SETUP ARE IDENTIFIED WHERE APPLICABLE IN THE OPERATING PROCEDURES.

(e) Operating Procedure. The operating procedures for using the Test Adapter to test the minimum performance standards of Tuned Cavity are provided in Table 3-16. If an abnormal indication is detected, refer to the troubleshooting and maintenance instructions for Tuned Cavity, FR-173/GRC, in TM-04165A-35/2, Maintenance and Overhaul Manual for Communications Central Group, AN/TYA-11.

(4) Test Set Coupler, MX-8153/TYA-11, Test Procedures. The operating instructions for using Test Set Coupler, MX-8153/TYA-11, to test the operation of a Synthesizer-Receiver, O-1282(V)/GRC, are composed of a list of ancillary test equipment and accessories, test setup instructions and detailed operating procedures.

(a) Test Equipment. The following ancillary test equipment and accessories are required when using Test Set Coupler, MX-8153/TYA-11, to test the operation of a Synthesizer-Receiver.

1. Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11 (part of Communications Test Kit, MK-1102/TYA-11)

2. Radio Set Control, C-3811/AR (part of Communications Test Kit, MK-1102/TYA-11)

3. Frequency Counter, Hewlett-Packard 5245L

4. Frequency Converter, Hewlett-Packard 5253B

5. Signal Generator, AN/USM-44

6. Oscilloscope, Fairchild 765MH

7. Plug-In Unit, Fairchild 74-11A

8. FM Signal Generator, Waltham 103 FSK

9. Signal Generator, AN/URM-127

10. Test cables and accessories as required (part of Communications Test Kit, MK-1102/TYA-11).

(b) Test Setup. To prepare for testing of a Synthesizer-Receiver using Test Set Coupler, MX-8153/TYA-11, proceed as follows:

1 On Test Set Coupler, MX-8153/TYA-11, set all front panel toggle switches to OFF (down) position.

2 On Radio Set Control, set front panel controls switches as follows:

<u>Control</u>	<u>Position</u>
OFF/PRESET/MAN-UAL switch	PRESET
PRESET CHANNEL switch	1
AM/FM switch	AM.

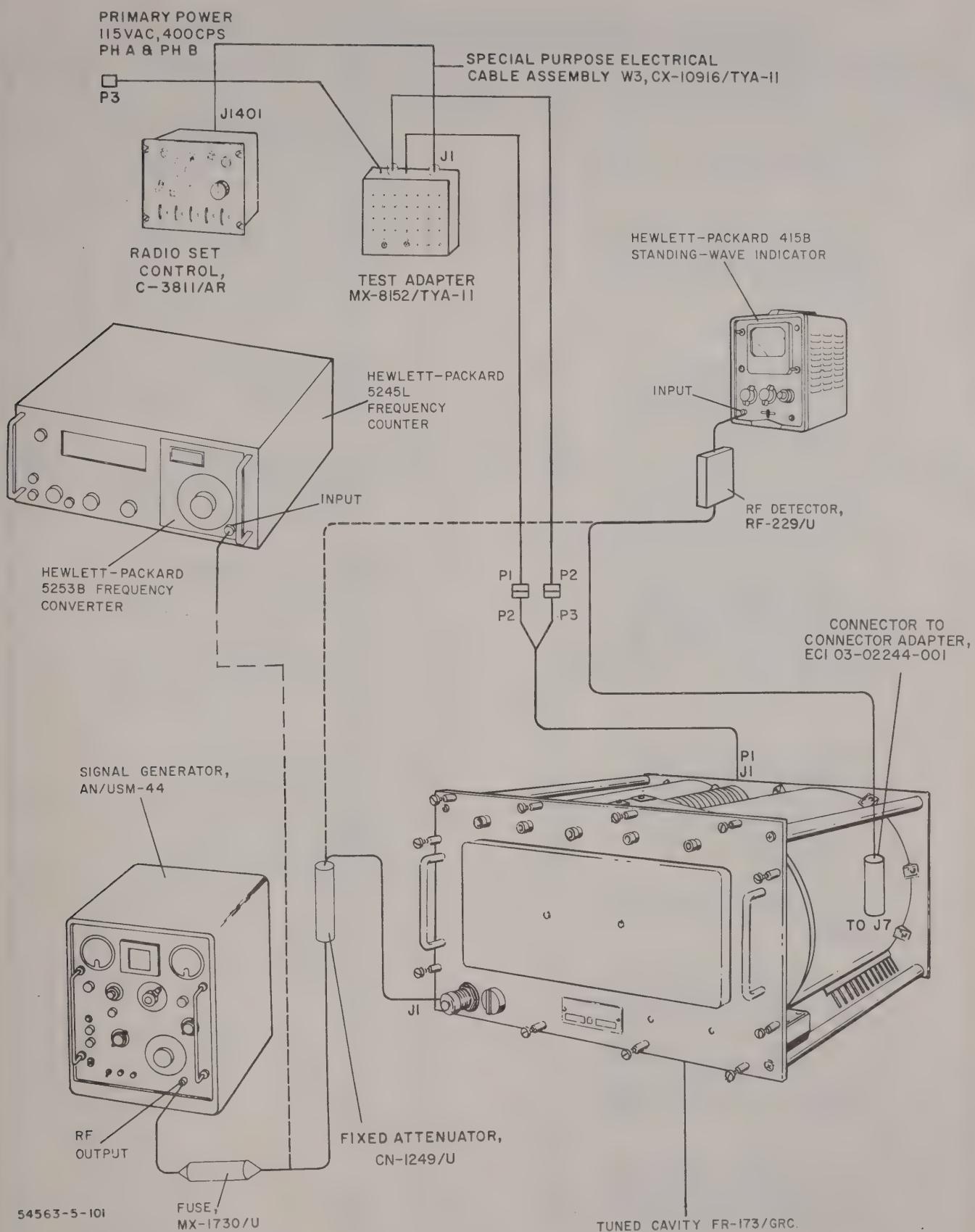


TABLE 3-16. OPERATING INSTRUCTIONS FOR TEST ADAPTER,
MX-8152/TYA-11, WHEN TESTING TUNED CAVITY, FR-173/GRC

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	On Test Adapter set AC ON/OFF and DC ON/OFF switches to ON.		AC and DC indicators light.
2	<p>On Radio Set Control set OFF/PRESET/MAN switch to PRESET and turn PRESET SELECT switch to 12.</p> <p style="text-align: center;">Note</p> <p style="text-align: center;">ALLOW A 10-MINUTE WARMUP AND STABILIZATION PERIOD BEFORE PROCEEDING.</p>		
3	<p>Insertion Loss Test. Measure loss at selected operating frequencies within 225.00 to 399.95 mcs range as follows:</p> <p>a. With signal generator connected to frequency counter, Figure 3-20, adjust the signal generator for an output frequency of 225.00 mcs as indicated on frequency counter.</p> <p style="text-align: center;">Note</p> <p style="text-align: center;">A SIGNAL AMPLITUDE OF AT LEAST 100 MILLIVOLTS IS REQUIRED TO DRIVE FREQUENCY COUNTER FOR FREQUENCY MEASUREMENTS.</p> <p>b. On Radio Set Control turn PRESET SELECT switch to position 1.</p> <p>c. Disconnect signal generator to RADIO input J1 of Tuned Cavity (refer to Figure 3-20).</p> <p>d. Adjust controls of signal generator for a 70 millivolt output signal modulated 40 percent at 1000 cps.</p> <p>e. Vary output frequency of signal generator slightly to obtain maximum output indication on standing wave indicator.</p>		

TABLE 3-16. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION										
3 (Cont)	<p>f. Readjust output signal amplitude and modulation level of signal generator to 70 millivolts and 40 percent, respectively.</p> <p>g. On standing wave indicator set INPUT SELECTOR switch to 200Ω XTAL, RANGE switch to 50 DB, and METER SCALE switch to EXPAND.</p> <p>h. Disconnect Fixed Attenuator from Tuned Cavity and connect to RF Detector (refer to Figure 3-20).</p> <p>i. On standing wave indicator adjust GAIN control for a zero indication on EXPANDED DB scale of front panel meter.</p> <p>j. Reconnect Fixed Attenuator to J1 and RF Detector to J7 on Tuned Cavity, FR-173/GRC.</p> <p>k. Observe and record insertion loss as indicated on EXPANDED DB scale of front panel meter.</p> <p>l. Repeat steps 3a thru 3k with signal generator adjusted for 263.25, 300.00, 366.75, and 399.95 mcs; and with PRE-SET SELECT switch on Radio Set Control set to position corresponding to test frequency as indicated below:</p> <table> <thead> <tr> <th>Frequency</th> <th>Position</th> </tr> </thead> <tbody> <tr> <td>263.25 mcs</td> <td>5</td> </tr> <tr> <td>300.00 mcs</td> <td>10</td> </tr> <tr> <td>366.75 mcs</td> <td>16</td> </tr> <tr> <td>322.95 mcs</td> <td>20</td> </tr> </tbody> </table>	Frequency	Position	263.25 mcs	5	300.00 mcs	10	366.75 mcs	16	322.95 mcs	20		<p>Insertion loss not to exceed 1.3 db.</p> <p>Insertion loss not to exceed 1.3 db for any test frequency.</p>
Frequency	Position												
263.25 mcs	5												
300.00 mcs	10												
366.75 mcs	16												
322.95 mcs	20												

TABLE 3-16. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
4	<p>Selectivity Test. Check selectivity of Tuned Cavity as follows:</p> <p>a. Interconnect Tuned Cavity, Test Adapter, and ancillary test equipment as shown in Figure 3-20.</p> <p>b. Repeat steps 3a thru 3g and 3i.</p> <p>c. Maintain 70 millivolt signal amplitude and 40 percent modulation level, and slowly decrease signal generator output frequency to point at which 1 db is indicated on EXPANDED DB scale of standing wave indicator.</p> <p>d. Using frequency counter measure and record low-side 1 db point frequency (refer to Note of step 3a).</p> <p>e. Set METER SCALE switch on standing wave indicator to NORMAL.</p> <p>f. Decrease output frequency of signal generator to point at which 6 db is indicated on DB scale of standing wave indicator.</p> <p>g. Using frequency counter measure and record low-side 6 db frequency.</p> <p>h. Increase output frequency of signal generator above 225.00 mcs to point at which 6 db is indicated on DB scale of standing wave indicator.</p> <p>i. Using frequency counter measure and record high-side 6 db frequency.</p> <p>j. Decrease output frequency of signal generator to point at which standing wave indicator indicates less than 2 db.</p>		

TABLE 3-16. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION										
4 (Cont)	<p>k. On standing wave indicator set METER SCALE switch to EXPAND and continue decreasing output frequency of AN/USM-44 to point at which standing wave indicator indicates 1 db on EXPANDED DB scale.</p> <p>l. Using frequency counter measure and record high-side 1 db frequency.</p> <p>m. Determine 1 db down bandpass by subtracting recorded low-side 1 db frequency, step 4d, from recorded high-side 1 db down frequency, step 4l.</p> <p>n. Determine 6 db down bandpass by subtracting recorded low-side 6 db frequency, step 4g, from recorded high-side 6 db frequency, step 4i.</p> <p>o. Determine mean center frequency by adding low-side 1 db frequency, step 4d, and high-side 1 db frequency, step 4l, and divide sum by 2.</p> <p>p. Repeat steps 4a thru 4o with AN/USM-44 adjusted sequentially for 263.25, 300.00, 366.75, and 399.95 mcs and with PRESET SELECT switch on Radio Set Control set to position corresponding to test frequency as indicated below:</p> <table> <thead> <tr> <th>Frequency</th> <th>Position</th> </tr> </thead> <tbody> <tr> <td>263.25 mcs</td> <td>5</td> </tr> <tr> <td>300.00 mcs</td> <td>10</td> </tr> <tr> <td>366.75 mcs</td> <td>16</td> </tr> <tr> <td>399.95 mcs</td> <td>20</td> </tr> </tbody> </table>	Frequency	Position	263.25 mcs	5	300.00 mcs	10	366.75 mcs	16	399.95 mcs	20		<p>Bandpass at least 400 kc/s wide at 6 db down points.</p> <p>Mean center frequency within ± 50 kc/s of assigned test frequency.</p> <p>Bandpass shall be at least 200 kc/s wide at 1 db down points and 400 kc/s wide at 6 db down points for each test frequency.</p>
Frequency	Position												
263.25 mcs	5												
300.00 mcs	10												
366.75 mcs	16												
399.95 mcs	20												

3 On Synthesizer-Receiver to be tested, turn VO SQUELCH MN potentiometer R2 fully counterclockwise and turn VO LEVEL MN potentiometer R1 fully clockwise.

4 Connect jack J1 and J2 of Test Set Coupler, MX-8153/TYA-11, to jacks J1 and J2, respectively, on Synthesizer-Receiver under test.

5 Using Special Purpose Electrical Cable Assembly W3, connect jack J3 on Test Set Coupler, MX-8153/TYA-11, to plug P1401 on Radio Set Control.

6 Connect plug P1 on Test Set Coupler, MX-8153/TYA-11, to primary power source (115 vac, 400 cps, ϕ A and ϕ B).

(c) Operating Procedures. Operating procedures for using Test Set Coupler, MX-8153/TYA-11, to test the operation of a Synthesizer-Receiver, are outlined in Table 3-17. If an abnormal indication is detected within the procedural steps of Table 3-17, refer to the troubleshooting and maintenance instructions for Radio Set, AN/GRC-112, (for Synthesizer- Receivers (ECI 03-00510-001 and 03-00510-003), provided in TM-04425A-35/2-1, Maintenance and Overhaul Technical Manual or TM-04437A-35/2, Maintenance and Overhaul Technical Manual for Radio Set, AN/GRC-134 (for Synthesizer- Receiver, ECI 03-00510-002).

Note

IN THE FOLLOWING PROCEDURAL STEPS ALL CONTROLS, INDICATORS, AND TEST POINTS ARE LOCATED ON TEST SET COUPLER, MX-8153/TYA-11, UNLESS OTHERWISE SPECIFIED.

(5) Radio Set Control, C-3811/AR, Test Procedures. Radio Set Control, C-3811/AR, is used in conjunction with Test Adapter, MX-8152/TYA-11, or Test Set Coupler, MX-8153/TYA-11, to provide channel selection control when testing Antenna Coupler, CU-1406/GRC, or Synthesizer- Receiver, ECI 03-00510-001, respectively. Complete test setup instructions and operating procedures for Radio Set Control, C-3811/AR (except for preset channel frequency selection) are therefore provided in the operating instructions for Test Adapter, MX-8152/TYA-11 (paragraph 3-3e(3) and Test Set Coupler, MX-8153/TYA-11, (paragraph 3-3e(4), respectively.

(a) Preset Channel Frequency Selection. Set the desired frequency for a specific preset channel on the memory drum using the headed grooved pin adjustment tool. The preset channel

number appears at the left of the memory drum and the frequency selection pins for that channel are in line with the number. Position each pin to the appropriate digit for the desired frequency. Repeat the procedure for each channel to be set. Table 3-18 identifies preset channel frequencies used for testing Antenna Coupler, CU-1406/GRC, and Synthesizer- Receivers, ECI 03-00510-001, -002, and -003.

(6) Fixed Mounting Rotating Counter, ECI 03-01937-001, Test Procedures. The operating procedures for using Fixed Mounting Rotating Counter, ECI 03-01937-001, to check the electrical and mechanical alignment of Amplifier Assembly, AM-4343(V)/GRC, of Radio Sets, AN/GRC-112, and AN/GRC-134, are composed of a list of ancillary test equipment and accessories, test setup instructions, and detailed operating procedures.

(a) Test Equipment. The following test equipment and accessories are required when using Fixed Mounting Rotating Counter, ECI 03-01937-001, to check the alignment of Amplifier Assembly:

1. Special Purpose Cable Assembly W52 (part of Accessory Kit, MK-852/GRC)

2. Special Purpose Cable Assembly W56 (part of Accessory Kit, MK-852/GRC)

3. Electrical Power Cable Assembly W1, CX-10932/TYA-11 (part of Communications Test Kit, MK-1102/TYA-11)

4. Electrical Power Cable Assembly W2, CX-10933/TYA-11 (part of Communications Test Kit, MK-1102/TYA-11).

(b) Test Setup. Prepare for a check of the alignment of Amplifier Assembly using Fixed Mounting Rotating Counter and proceed as follows:

1 For alignment check of Amplifier Assembly in Radio Set, AN/GRC-112, position front panel controls as indicated below:

Control	Position
ON/PRIM. PWR EMER OFF switch	PRIM. PWR EMER OFF
HV ON/STBY switch	STBY
METER SELECTOR switch	FWD
CHANNELING MODE switch	MAN.

TABLE 3-17. OPERATING INSTRUCTIONS FOR TEST SET COUPLER, MX-8153/TYA-11, WHEN
TESTING SYNTHESIZER-RECEIVER, ECI 03-00510-001, ECI 03-00510-002, or ECI 03-00510-003

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION																																								
1	Set AC ON/OFF switch to ON.		AC indicator lights.																																								
2	Set DC ON/OFF switch to ON.		DC indicator lights.																																								
3	<u>VFO Frequency Test.</u> Check VFO frequency of Synthesizer- Receiver under test as follows: <ol style="list-style-type: none"> Connect frequency counter with plug-in unit to VFO A2 connector. On Radio Set Control, turn FREQUENCY SELECT switch to position 1. Observe frequency indica- tion on frequency counter. On Radio Set Control, turn FREQUENCY SELECT switch sequentially to positions 2 thru 20, observing frequency indica- tion for each position. 	VFO connector VFO connector	46.250 mcs ± 350 cps <table> <thead> <tr> <th>Position</th> <th>Frequency</th> </tr> </thead> <tbody> <tr><td>2</td><td>48.0375 mcs ± 350 cps</td></tr> <tr><td>3</td><td>50.2875 mcs ± 350 cps</td></tr> <tr><td>4</td><td>53.0500 mcs ± 350 cps</td></tr> <tr><td>5</td><td>55.8125 mcs ± 350 cps</td></tr> <tr><td>6</td><td>58.5875 mcs ± 350 cps</td></tr> <tr><td>7</td><td>61.3250 mcs ± 350 cps</td></tr> <tr><td>8</td><td>64.1000 mcs ± 350 cps</td></tr> <tr><td>9</td><td>64.8625 mcs ± 350 cps</td></tr> <tr><td>10</td><td>65.0000 mcs ± 350 cps</td></tr> <tr><td>11</td><td>67.8875 mcs ± 350 cps</td></tr> <tr><td>12</td><td>70.6375 mcs ± 350 cps</td></tr> <tr><td>13</td><td>73.4000 mcs ± 350 cps</td></tr> <tr><td>14</td><td>76.1500 mcs ± 350 cps</td></tr> <tr><td>15</td><td>78.9375 mcs ± 350 cps</td></tr> <tr><td>16</td><td>81.6875 mcs ± 350 cps</td></tr> <tr><td>17</td><td>84.4500 mcs ± 350 cps</td></tr> <tr><td>18</td><td>87.2000 mcs ± 350 cps</td></tr> <tr><td>19</td><td>89.7375 mcs ± 350 cps</td></tr> <tr><td>20</td><td>89.9875 mcs ± 350 cps</td></tr> </tbody> </table>	Position	Frequency	2	48.0375 mcs ± 350 cps	3	50.2875 mcs ± 350 cps	4	53.0500 mcs ± 350 cps	5	55.8125 mcs ± 350 cps	6	58.5875 mcs ± 350 cps	7	61.3250 mcs ± 350 cps	8	64.1000 mcs ± 350 cps	9	64.8625 mcs ± 350 cps	10	65.0000 mcs ± 350 cps	11	67.8875 mcs ± 350 cps	12	70.6375 mcs ± 350 cps	13	73.4000 mcs ± 350 cps	14	76.1500 mcs ± 350 cps	15	78.9375 mcs ± 350 cps	16	81.6875 mcs ± 350 cps	17	84.4500 mcs ± 350 cps	18	87.2000 mcs ± 350 cps	19	89.7375 mcs ± 350 cps	20	89.9875 mcs ± 350 cps
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2	48.0375 mcs ± 350 cps																																										
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7	61.3250 mcs ± 350 cps																																										
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11	67.8875 mcs ± 350 cps																																										
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18	87.2000 mcs ± 350 cps																																										
19	89.7375 mcs ± 350 cps																																										
20	89.9875 mcs ± 350 cps																																										
4	<u>Audio Output Check.</u> Check audio outputs of Synthesizer-Receiver under test as follows: <ol style="list-style-type: none"> Disconnect frequency counter from VFO A2 con- nector. On Radio Set Control, set PRESET CHANNEL switch to 1. 																																										

TABLE 3-17. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
4 (Cont)	<p>c. Connect Signal Generator, AN/URM-127, to EXT MOD input on Signal Generator, AN/USM-44.</p> <p>d. Connect Signal Generator, AN/USM-44, output to ANT. A1 connector on Test Set Coupler, MX-8153/TYA-11.</p> <p>e. Adjust Signal Generator, AN/USM-44, for 225.00 mcs, 10-microvolt signal externally modulated by a 1000 cps signal from Signal Generator, AN/URM-127.</p> <p>f. Connect oscilloscope with plug-in unit, between AUDIO HIGH test jacks and observe waveform.</p> <p>g. Vary modulation frequency output of Signal Generator, AN/URM-127, from 300 cps to 25,000 cps while observing output waveform.</p>	AUDIO HIGH test jack	1000 cps signal with minimum amplitude of 5 volts peak-to-peak
5	<p><u>Receiver Mute Test.</u> Check ability of Synthesizer-Receiver under test to mute audio output signal as follows:</p> <p>a. Adjust Signal Generator, AN/URM-127, for 1000 cps modulation signal and observe output waveform on oscilloscope</p> <p>b. Set RCVR MUTE ON/OFF switch to ON.</p> <p>c. Set RCVR MUTE ON/OFF switch to OFF.</p>		1000 cps audio output Loss of 1000 cps output signal
6	<p><u>Squelch Disable Test.</u> Check ability of Synthesizer-Receiver to attenuate noise levels as follows:</p> <p>a. Observe noise level of audio output signal displayed on oscilloscope.</p>		1000 cps audio output signal plus noise

TABLE 3-17. (Continued)

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
6 (Cont)	<p>b. Set SQUELCH DIS ON/OFF switch to ON and observe noise level of audio output signal displayed on oscilloscope.</p> <p>c. Set SQUELCH DIS ON/OFF switch to OFF.</p>		Noise level increases.
7	<p>Data Output Check. Check data output of Synthesizer-Receiver under test as follows:</p> <p>a. Disconnect Signal Generator, AN/USM-44, from ANT. A1 connector.</p> <p>b. On Radio Set Control set AM/FM switch to FM.</p> <p>c. Connect FM signal generator to ANT. A1 connector and adjust FM signal generator for 225.00 mcs, 10-microvolt output signal with carrier deviation of ± 20 kc/s at 1000 cps.</p> <p>d. Connect oscilloscope with plug-in unit between DATA 1 and DATA 2 test jacks and observe output waveform.</p>	DATA 1 and DATA 2 test jacks	1000 cps sine wave with minimum amplitude of 5 volts peak-to-peak

TABLE 3-18. PRESET CHANNEL FREQUENCIES

CHANNEL	FREQUENCY (MCS)	CHANNEL	FREQUENCY (MCS)
1	225.00	11	311.55
2	232.15	12	322.55
3	241.15	13	333.60
4	252.20	14	344.60
5	263.25	15	355.75
6	274.35	16	366.75
7	285.30	17	377.80
8	296.40	18	388.80
9	299.45	19	398.95
10	300.00	20	399.95

<u>Control</u>	<u>Position</u>
KEY CONTROL switch	NORMAL
MODULATION MODE switch	VOICE
OPERATIONAL MODE switch	SINGLE FREQ
ANTENNA switch	SEP
BATTLE SHORT switch	OFF
TEST KEY switch	Off (Center)
LOCAL PRESET CHAN switch	10
TRANSMIT FREQUENCY switches	225.00
RECEIVE FREQUENCY switches	225.00

2 For alignment check of Amplifier Assembly in Radio Set, AN/GRC-134, position front panel controls as indicated below:

<u>Control</u>	<u>Position</u>
PRIMARY PWR ON/EMERGENCY OFF switch	EMERGENCY OFF
HV ON/STBY switch	STBY
CHANNELING MODE switch	MAN.
MODULATION MODE switch	VOICE
OPERATION MODE switch	SINGLE FREQ
ANTENNA switch	SEP
BATTLE SHORT switch	OFF
METER SELECTOR switch	FWD
TEST KEY switch	Off (Center)
KEY SELECTOR switch	NORMAL

3 For alignment check of Amplifier Assembly in Radio Set, AN/GRC-112, connect Electrical Power Cable Assembly W1 between connector A7A1J1 and the primary power source.

4 For alignment check of Amplifier Assembly in Radio Set, AN/GRC-134, connect Electrical Power Cable Assembly W2 between connector A4A1J2 and the primary power source.

5 Extend Amplifier Assembly from the Electrical Equipment Cabinet (CY-4676/GRC-112 for Radio Set, AN/GRC-112, or CY-4677/GRC-134 for Radio Set, AN/GRC-134) using Special Purpose Cable Assembly W52.

6 Remove front panel of Amplifier Assembly by removing four front panel Phillips-head screws and carefully raise the front panel, without disconnecting connector J1, to provide access to front of gearbox.

(c) Operating Procedures. The operating procedures for using Fixed Mounting Rotating Counter to check the alignment of Amplifier Assembly are provided in Table 3-19. If an abnormal indication is detected, refer to the adjustment procedures outlined in paragraph 5-2-3d3 of TM-04425A-35/2, Maintenance and Overhaul Technical Manual for Radio Set, AN/GRC-112, or paragraph 5-3d3 of TM-04437A-35/2, Maintenance and Overhaul Manual for Radio Set, AN/GRC-134, as applicable.

f. COMMUNICATIONS TEST KIT, MK-1104/TYA-11, OPERATING PROCEDURES. Operating instructions for using the test fixtures and accessories contained in Communications Test Kit, MK-1104/TYA-11, are provided where applicable, in the technical manuals describing troubleshooting and maintenance of the individual equipments with which each test item is associated. Refer to Table 1-3 for the intended use of each test item in Communications Test Kit, MK-1104/TYA-11, and refer to Table 1-5 for applicable publications.

3-4. OPERATOR'S MAINTENANCE

a. OPERATING CHECKS AND ADJUSTMENTS. There are no operator checks and adjustments required when operating Test Set Coupler, MX-8154/TYA-11, or the test fixtures and accessories of Communications Test Kits, MK-1102/TYA-11, or MK-1104/TYA-11. Required adjustment procedures for the Communications Central Group, AN/TYA-11, test equipment are provided in paragraph 5-3 of this manual.

b. EMERGENCY OPERATING PROCEDURE. There are no emergency operating procedures for Test Set Coupler, MX-8154/TYA-11, or for the test fixtures and accessories contained in Communications Test Kits, MK-1102/TYA-11, and MK-1104/TYA-11, other than replacement of defective fuses and indicator lamps.

TABLE 3-19. OPERATING INSTRUCTIONS FOR FIXED MOUNTING
ROTATING COUNTER, ECI 03-01937-001, WHEN TESTING AMPLIFIER ASSEMBLY, AM-4343/GRC

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION
1	On Radio Set, AN/GRC-112, set ON/PRIM. PWR EMER OFF switch to ON. (On Radio Set, AN/GRC-134, set PRIMARY PWR ON/EMERGENCY OFF switch to PRIMARY PWR ON.)		
2	On Radio Set, AN/GRC-112, set TRANSMIT and RECEIVE FREQUENCY SELECT switches to 300.00 mcs. (On Radio Set, AN/GRC-134, set FREQUENCY SELECT switches to 300.00.)		
3	Preset Fixed Mounting Rotating Counter to 460.		
4	Attach Fixed Mounting Rotating Counter to mounting holes provided in front of gearbox. CAUTION OBSERVE PROPER SHAFT CENTERING OF FIXED MOUNTING ROTATING COUNTER.		
5	By means of TRANSMIT FREQUENCY SELECT switches on Radio Set, AN/GRC-112, FREQUENCY SELECT switches on Radio Set, AN/GRC-134), channel Radio Set 10 mcs above and below 300.00 mcs and then return to 300.00 mcs.		Fixed Mounting Rotating Counter indicates 460 after Radio Set rechanneled to 300.00 mcs.
6	Set ON/PRIM. PWR EMER OFF switch to OFF.		

